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SEAT WEAVING

By

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THIRD EDITION

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PREFACE

This book was published in 1917. Since then it has undergone two revisions, and more than twenty printings. At the time of publication handwork in the schools was known as manual training. Wood was the usual medium used. The author felt that the addition of weaving in conjunction with woodwork would lend variety to shop experiences, maintain interest, and provide motivation for better work. Therefore he introduced in the shops such mediums as cane, reed, rush, and splints. These enriched the wood structures and added materially to constructive design.

The years intervening since the publication of the book have witnessed many changes in the composition of workshops in the schools. General shops were developed to provide greater variety of experiences with basic materials. Industrial arts workshops developed rapidly. The introduction of these shops attested to the fact that woodwork alone was not sufficient to satisfy the needs of the participants or to give the rich experiences which ultimately might lead to selection of a vocation. Certainly they developed sound avocational interests. The many changes in shop makeup attested to the need for a variety of experiences in the handwork curriculum. This book continues to serve the function for which it was originally prepared.

The originals of the projects illustrated by photographs, with few exceptions, were constructed by boys in the eighth grade. They indicate the character of work which may be expected of boys at this level when interest is aroused.

Acknowledgments are made to the Bruce Publishing Company for permission to use certain materials in Chapters I and II which appeared in the *Industrial Arts Magazine;* to T. S. Moore, Joliet, Illinois, for his cooperation in much of the photographic work; and to the instructors in the Joliet Department of Manual Training who assisted in directing the construction of many of the projects.

In the second edition of this book the chapter on Spider Web Weave was added. This appeared in substantially the same form in the *Manual Training Magazine* of March, 1918.

New illustrations were added to the third edition of SEAT WEAVING. They were line drawings which showed with clarity the various processes in cane weaving. These supplanted halftones which illustrated the processes. New text matter also was added, primarily to describe the construction of two new projects and clarify some phase of the weaving process.

In this edition the preface has been rewritten and some text matter added.

L. DAY PERRY

Chicago, Illinois
March, 1952

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CANING; THE SEVEN STEPS

That caning has not been undertaken to any appreciable extent in school shops is due to the fact that instructors are unfamiliar with the weaving processes. Caning is not difficult. It, in common with many other lines of activity, is best learned through observation. However, it may be undertaken by the average person after careful study of printed directions and illustrations. If the worker will closely observe his own work as it progresses, and follow instructions carefully, he should have no unusual difficulty in caning an area very acceptably in the initial attempt. Particular attention should be paid to directions which tell of errors to avoid. Errors creep in, in a very unobtrusive manner at times, and the amateur will find them hard to detect.

Cane.—Cane is the name applied to a great number of plants which possess long, slender, reedlike stems. The name should apply only to a class of palms called rattans. These plants are found throughout the Indian Archipelago, China, India, Ceylon, and the Malay Peninsula. They grow in dense, dark forests and form a matted undergrowth which makes passage difficult or impossible. These palms are trailing in tendency, yet frequently grow to tree height. They then fall over and lie on the ground. The stem is covered with beautiful green foliage, grows to a length of 100 to 300 ft., and rarely exceeds 1 in. in diameter. The stems are cut into lengths of 10 to 20 ft. for export. The outer bark is stripped into widths varying from 1/16 to 3/16 in. These strips are put into hanks of 1,000 lineal feet each. The cane is then ready for the cane weaver. The width of the cane and its quality determines the price per hank. It may be purchased from any upholstery supply house.

Cane is named from the narrowest to the widest in order: carriage, superfine, fine-fine, fine, medium, common, narrow binder, and wide binder. Cane from India has a very glossy surface, while that from other localities is duller. The right side of the cane is easily determined by this glossiness.

Cane for weaving purposes should not be confused with the popularly called cane or bamboo of our southern states, where it forms the well-known canebrakes. The cane rarely exceeds a height of 20 ft. It grows rapidly and very straight, and to an appreciable

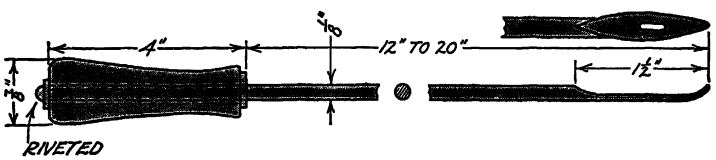


FIG. 1. HAND-CANING NEEDLE

diameter. Such cane is used for bamboo furniture, walking sticks, poles, etc. The ordinary domestic sugar cane, also, should not be confused with seating cane.

Equipment.—The tools needed in cane weaving are few in number. A special one is called the caning needle. This may be made in the school shop. Fig. 1 shows a working drawing of the needle. Its length is variable, depending upon the work at hand. It is desirable to have a number of different lengths. The tool is made of good flexible steel wire. This is flattened at one end, an eye cut in it, blunt pointed, and slightly curved as indicated. The other end is inserted in an ordinary small tool handle, extended through and riveted. The riveting prevents the wire from drawing out of the handle under a pulling strain.

The other tools needed are a scratch awl, and a pair of scissors or knife. A buttonhook with the hook straightened or cut off may take the place of the awl. A pair of dividers and rule are neces-

sary for marking. Several wooden pegs are needed. These may be classed with the tools. They are made from a ¼ in. dowel rod or the equivalent. Cut them about 4 in. long and point them as you would a lead pencil. The amateur is inclined to use a number of pegs. Four should prove amply sufficient.

Beginning the Operation.—Fig. 2 is a photograph of an upholstered leg rest with caned sides. This rest will be used for our initial work in cane weaving, inasmuch as the area for caning is rectangular. It is not advisable for the beginner to have his initial experience on a chair seat, for the area is usually of an odd shape, and arms, legs, and back interfere. However, any rectangular area on which there are no projections to bother may be used for the first trial.

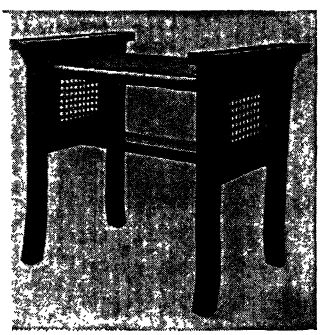


FIG. 2. LEG REST

It is assumed that the sides of the rest have been fitted. The rails and stiles are then assembled with glue, without the posts. When the glue has set the proper length of time, and the frame is cleaned and sanded, the rails and stiles are ready to dimension.

Draw pencil lines entirely around the inner sides of the rails and stiles, ½ in. from the edges. This distance remains constant, usually, on all areas and with canes of various widths. With a pair of dividers set at ½ in., space off points on the pencil lines, starting from the intersection of the extended lines on each rail. Fig. 3 is a working drawing of a corner, dimensioned as suggested. It will make clearer the directions. It is fundamental that the spacing be done in the same direction on parallel rails, for at times the last space will be a short ½ in. or whatever dimension is used. In such cases it is necessary to redivide the last several spaces into

divisions as near ½ in. as possible. It thus becomes obvious why spacing must be done in one direction as stated. This applies to all rectangular frames.

With a 3/16 in. wood bit bore holes through the rails and stiles at the points marked. Countersink the holes slightly on the underside of the frame. This is not absolutely necessary but aids considerably in locating the holes, and in other ways. In shops where power machinery is available a vertical borer may be used for this purpose. It is best to carefully mark the points for boring with a center punch. The twist bit will then start accurately and the danger for getting out of line will be reduced to a minimum. The dimensions given here are for fine-fine cane. Use sandpaper to remove pencil lines and rough edges left from boring; then clamp the frame over the edge of a table or bench with a carriage clamp. Sit while doing the weaving.

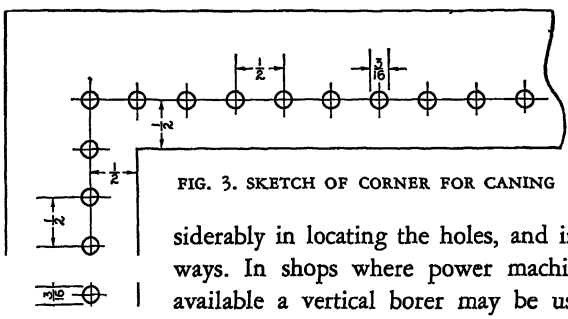


FIG. 3. SKETCH OF CORNER FOR CANING

The Seven Steps in Caning.—For convenience in explanation, the successive operations in hand caning are so distinct that they are termed "steps." There are actually six steps in standard caning. The application of a binder is the seventh and last step, although it is not a logical part of the weaving process. Start the first operation across the long way of the frame, for then the caning needle may be used across the short distance.

Step 1. Fig. 4 shows the start of the work. Begin at A. Fasten the strand in the hole with a peg. Carry the strand across to B,

across underneath to C, up through C, then across the frame to D. Keep the strand reasonably tight. A peg may be used, temporarily, at C to keep the strand from slipping back. A peg may be used at each successive hole for the same reason. The drawing shows clearly how the strands continue across the frame, and, regardless of the size of the frame. If more than one strand is required, a new one begins where the preceding one ends. Use pegs, whenever necessary, to hold strands in place. How the loose ends are tied will be described later.

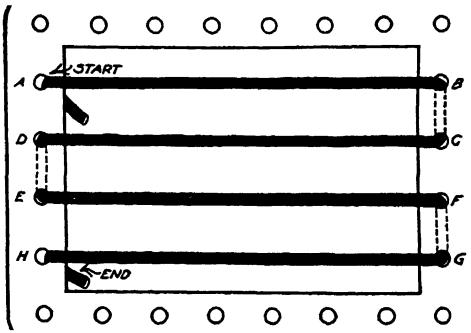


FIG. 4. INSERTING FIRST LAYER OF STRANDS

Step 2. Fig. 5 shows the second layer of strands. These run over the first layer of strands at right angles to them. The start and the end are clearly shown on the drawing.

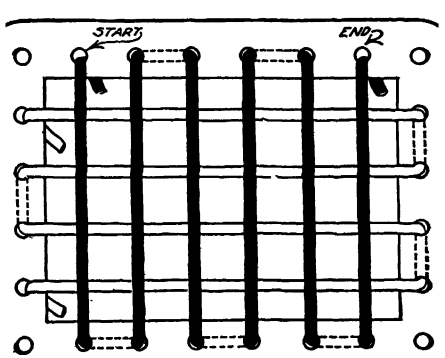


FIG. 5. INSERTING SECOND LAYER OF STRANDS

Step 3. The third layer of strands runs parallel to the first and over both the first and second. The process is identical to the first two steps.

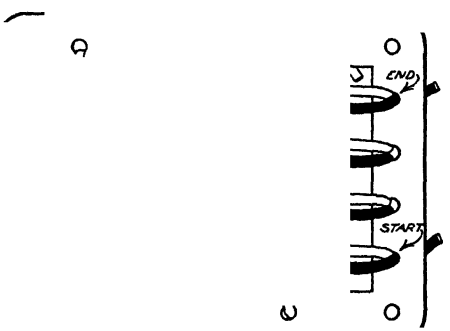


FIG. 6. INSERTING THIRD LAYER OF STRANDS

This is shown in Fig. 6. On a larger frame there will have accumulated a number of loose ends by now, and the pegs that are used to hold them will interfere with the work. These ends should be tied underneath the frame by twisting them around the loops of strands which run from one hole to another underneath. Two methods of tying are given in the sketch shown at Fig. 7. This sketch shows the bottom of the frame rail. The pegs may be removed when the ends are tied and the work may proceed. It is advisable to tie these ends as the work progresses, for a better job will result.

Step 4. In this step the actual weaving begins. The drawing at Fig. 8 shows how the caning needle is used to weave in the strands of this step. After the strand has been pulled its full remaining length up a given hole, it is threaded into the eye of the needle and is then pulled across the frame by the needle. This process is repeated until the strands are all paired. The needle is not absolutely necessary. A heavy wire may be used to separate the strands in an identical manner; then the weaver strand is "snaked" through beside the wire. However, the needle permits the workman to work with greater speed.

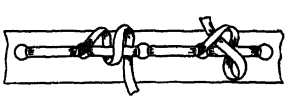


FIG. 7. METHODS OF TYING ENDS OF CANE

Step 5. Before this operation is begun, the strands should be arranged in pairs. They will pair easily if the cane is dampened thoroughly. Force the strands as close together as possible. This

operation will form hollow squares over the entire panel. The rows of strands should also be kept parallel and straight. A peg in either hand will assist materially in this pairing. This job must be very well done, or otherwise the next two steps will prove difficult.

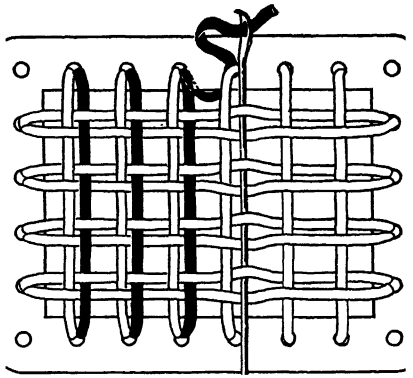


FIG. 8. WEAVING THE STRANDS WITH THE CANING NEEDLE

Fig. 9 shows how the first diagonal strand is woven. Two strands are run into each corner hole on all rectangular frames. Perform this step by keeping one hand above the frame and one underneath. On larger frames it will be found necessary to pull the strand through when only part way across, due to the binding of the strand. How "not to do it" is also shown on this sketch. It clearly shows the right and the wrong way. Avoid the error referred to.

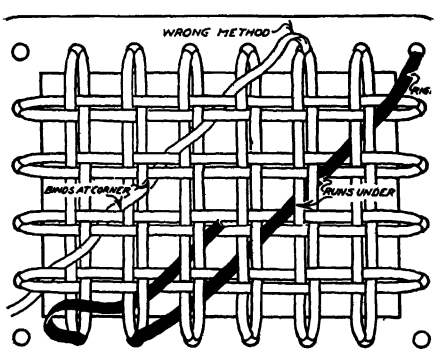


FIG. 9. WEAVING THE FIRST DIAGONAL STRANDS

Step 6. Two diagonal strands are shown of this step in Fig. 10. As in the preceding step, two diagonals always are run into the four corner holes on rectangular frames. Watch carefully when

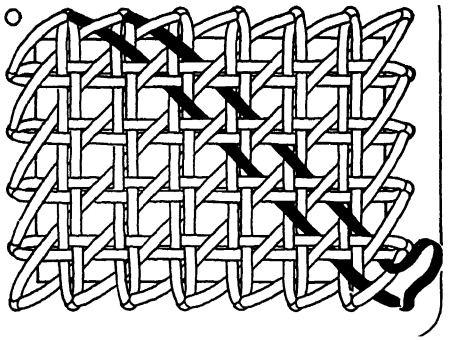


FIG. 10. WEAVING THE SECOND DIAGONAL STRANDS

weaving the edges to be sure that the weaver is run over or under the right strands. Careless workmanship here will show clearly on the finished panel. The ideal panel is shown in Fig. 11. The diagonal strands run smoothly at the corners of the mesh; the first four strands are straight and well paired; the edges are smooth; and two diagonal strands run into each corner hole.

Step 7. Actually, the application of a binder as shown in Fig. 12 is not a true step in caning, for the panel is complete without it and it may be left off if desired. The method of application is clearly illustrated. The binder cane is laid over the holes. A loop of fine cane through each or alternate holes holds it in place. This cane should be pulled very tightly, and the workman must not let the cane slip back or the binder will not fit down snugly. To finish the operation, the binder is lapped over two or three holes and these

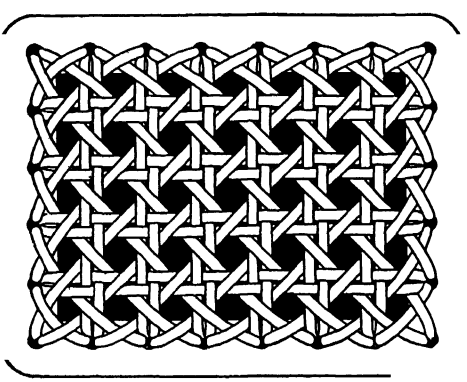


FIG. 11. THE COMPLETED WEAVE

ends are fastened down together. When the last loop is made, the end of the strand is fastened by plugging the hole from underneath or by tying it underneath.

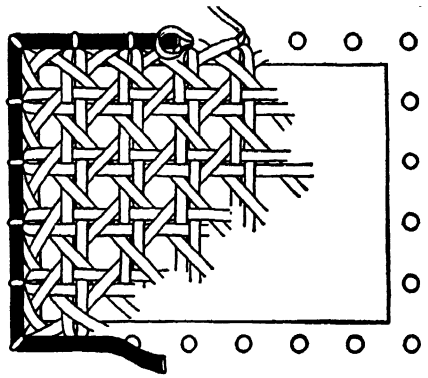
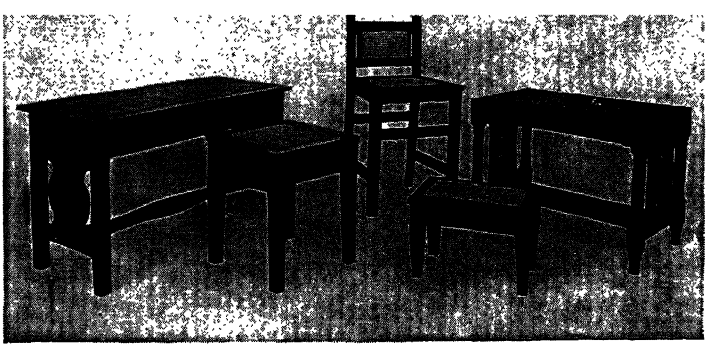


FIG. 12. APPLICATION OF THE BINDER

Small hairlike projections will be noted over the panel. The panel should be dampened and then passed over a gas flame to remove them. If a blow torch is used, exercise extreme caution to avoid burning the cane. The panel is now completed. When dry, it should ring when snapped sharply with the fingers.



SUGGESTIVE PROJECTS

CANING SUGGESTIONS

As weaving progresses difficulty will be experienced in inserting cane ends in the holes, due to their becoming filled. Force the scratch awl through and turn it several times. This will effectively force an opening.

In many instances long ends of cane remain from one series to another. These generally, as previously mentioned, should be used in succeeding steps. There is one limitation. They should be used, provided it is not necessary to carry them over more than four holes on the under side of the frame. The fewer loose ends left, the better, for the caning is thereby neater and better. It is generally advisable to use a full-length strand to avoid a number of loose ends.

The amateur will find his greatest difficulty in properly weaving the diagonals at the edges; that is, immediately upon entering or leaving a hole. Many commendable pieces of caning are spoiled by ragged, improperly woven edges. Care must be taken to see that the cane goes *over* and *under* the proper strand or strands at these points. Fig. 9 clearly shows how the diagonals should run. Study it carefully.

The addition of a binder is generally a matter of taste. Perhaps 50 per cent of modern hand-caned furniture does not employ a binder of any description. The series of regularly exposed holes are rather pleasing and in no way detract. However, in chair seats a binder is essential to protect the ends of canes, for they are subject to hard wear.

Binders of reed or of wood called "splines" may be used on hand-caned frames. If either is used, a groove 1/4 in. deep and 3/16 in. wide is cut coincident with the holes before weaving is begun. After the area is caned the strips are fitted and glued in. Use little

glue. Tap the splines firmly with a mallet used over a block of wood, until they are flush with the woven cane. Chapter IV gives the method in detail.

The size of the holes and the distance between them is determined largely by the size of the cane used. Some prefer coarse-meshed areas, while others desire them closely woven. There is, however, what we may term a standard mesh. The individual may vary the dimensions given to suit himself. The Jacobean or early caning was invariably of coarse mesh.

Carriage and superfine cane require 1/8 in. holes and 3/8 in. spaces; fine-fine cane requires 3/16 in. holes and 1/2 in. spaces; fine cane requires 3/16 in. holes and 5/8 in. spaces; medium, 1/4 in. holes and 3/4 in. spaces. Fine-fine and fine cane are the best sizes for shop use. A small amount of medium binder is desirable.

One hank of cane will ordinarily be sufficient for a half-dozen areas of approximately 12 in. by 12 in.

Most old pieces of period furniture utilizing cane employ a particularly narrow split horizontally and vertically, and a wider split diagonally. The opposite practice may be employed—a finer split of cane being used diagonally than horizontally and vertically. Both effects are pleasing.

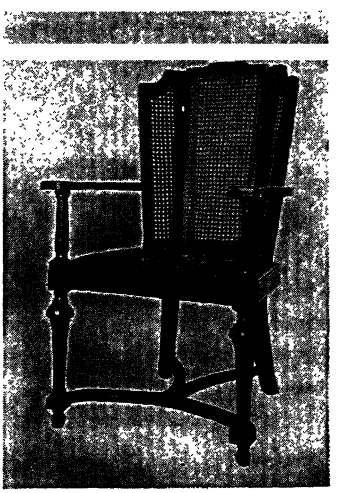


FIG. 13. WING BACK CHAIR

In all illustrations of rectangular areas shown herein, corner holes are bored and utilized in the cane weaving. These are not absolutely necessary; in fact, caned areas on many pieces of period

and modern furniture do not utilize corner holes. In such instances two diagonal strands are run in each hole on either side of the corner. A comparison of the areas, the one employing a corner hole, and the other not, will lead the observer to conclude that the former appears complete while the latter appears unfinished.

It is frequently necessary or desirable to cover up the cane on the back or inside of an article. This is true of places exposed to view, and is especially advisable on such pieces of furniture as the wing back chair shown in Fig. 13. This chair of William and Mary design was made in a school shop, is hand caned, and of mahogany. The exposed cane is covered with strips of mahogany ¼ in. thick and 1 in. wide, in which a groove ⅛ in. deep and ⅜ in. wide has been run. This groove may be made with saw, chisel, or combination plane. Fig. 14 shows a sketch of such a strip. It makes a neat, pleasing cover. Many pieces of so-called expensive furniture have ragged, exposed caning. This is unsightly and is not to be commended.

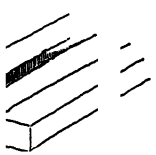


FIG. 14. SKETCH OF STRIP TO COVER CANE ENDS

Wherever it is found desirable to leave cane natural, it is necessary that the frame be stained before caning is begun. Box fuming will not permanently color cane. Oil stains make no appreciable impression if rubbed off at once. But water, acid, and alcohol stains produce decided colors. If the worker desires to color the cane approximately the same shade as the article, the caning may be done on the white wood and the entire article stained at the one operation. Cane may be shellacked or varnished or left natural, as desired.

Irregular Areas.—Fig. 15 shows a close view of the back of the chair illustrated in Fig. 13. This is a typical example of an irregular-shaped area for caning. The principles of weaving remain the same in areas of any shape, yet each requires slightly different treatment. Each has its individual problem. It is necessary to skip some holes altogether. This is never done in rectangular shapes.

A close inspection of the photograph will reveal many skipped holes. This is necessary to keep parallel strands equidistant, and diagonals straight.

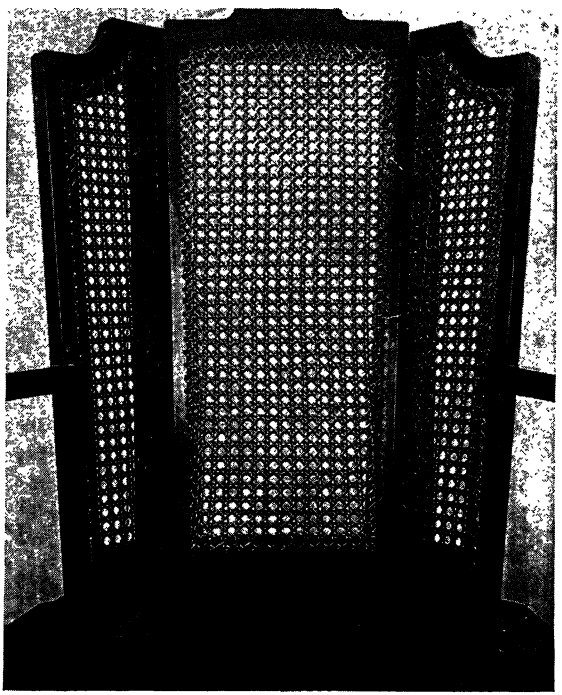


FIG. 15. BACK OF CHAIR SHOWING ODDLY SHAPED AREAS

To clearly understand how the holes are located on a wing of this chair refer to Fig. 16. The left upright and lower rails are at right angles to each other. The upper rail is curved and the right upright slanted. Measurements are begun at the lower left-

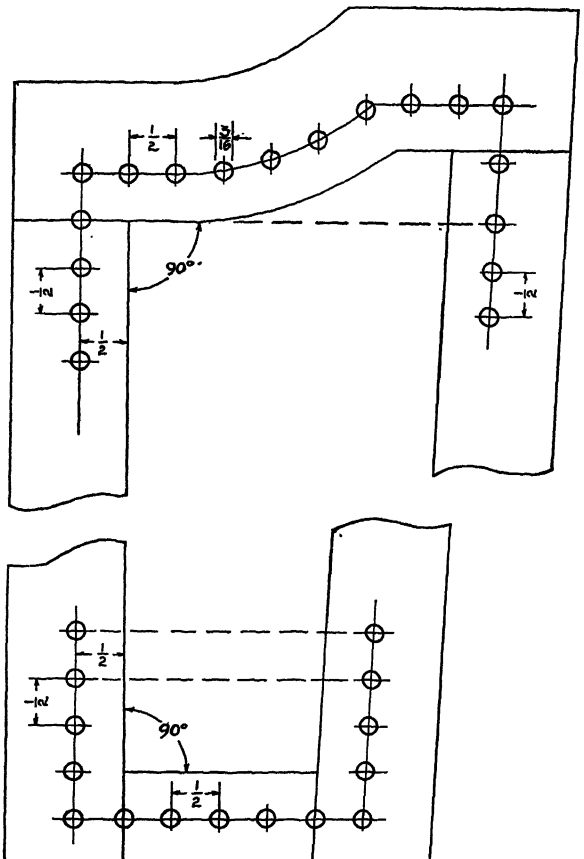


FIG. 16. METHOD OF LOCATING HOLES ON WING OF CHAIR

hand corner and proper distances spaced on the left upright. With the arm of a try square against this upright, points are marked on the opposite upright in line with those on the former. This operation is repeated on the lower rail and the upper curved one. Strands

of cane will then obviously run parallel. Inasmuch as there are five holes in the base and eight in the top it is necessary that three vertical strands be run into the slanting upright in any hole which will permit the strands to run parallel to each other. The photo-

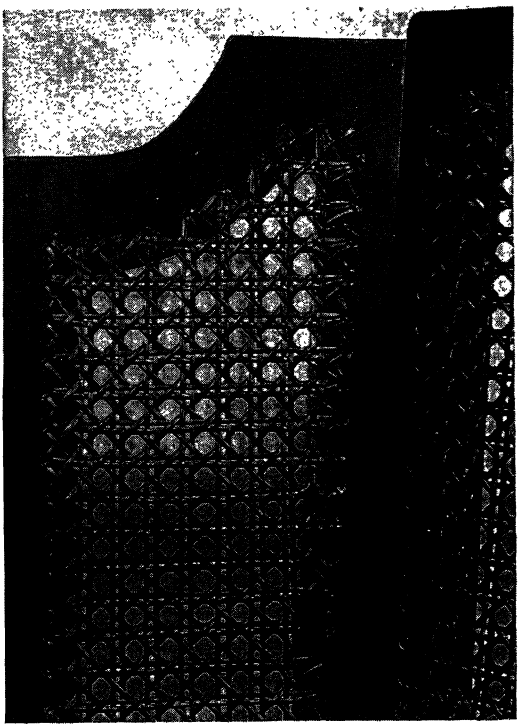


FIG. 17. CLOSE VIEW OF WING

graph of the caned wing, shown in Fig. 17, should make very clear the foregoing explanation. Experience with several unusual shapes is necessary before the weaver feels confident of readily caning any area of odd shape.

In weaving the diagonals it is frequently necessary to run several in one hole in order to keep the canes as straight as possible. Just when this should be done can only be determined by the worker. A diagonal should never be permitted to swing to any great degree out of a straight line. A close observation of the photograph of the wing will reveal many diagonal canes in one hole, and several holes skipped entirely.

Irregular Chair Seats.—Two chair frames of irregular shapes are shown in Figs. 18 and 19. These are essentially typical of all such frames. The layout for that illustrated at Fig. 18 is as follows:

Gauge the usual line ½ in. from the inner edge. From the front of the irregular form lay off one half the length of the front rail. With the beam of a framing or large try square against the front rail, locate the center of the back rail. These two centers are indicated by the center line on the drawing. Step off the spaces for the holes on these rails beginning, in each case, from the centers. Lay off the spaces on the side rails, beginning from the front corners on the scribed lines. The set of the divider may be slightly increased for the slant rails so that when the two strands of cane cross the space between them they will be a square, or very nearly one. If the divisions do not "come out" fairly equal, the last few spaces may be redivided to suit.

In Fig. 19 two diameters are laid off at right angles to each other. The spaces for the holes are stepped off from these at each quarter, as indicated by the center lines on the drawing. Several spaces between on each of the four quarters will need to be redivided. This space is shown in typical manner by the arrow on the sketch. The purpose of this redivision is to permit the strands of cane of Steps 1 and 2 to form square spaces. It is not possible to produce such squares throughout on a circular frame, but the neatness of the finished job depends in no small degree on how nearly they are squared. Some caning experts advocate beginning the lay-

out at any point on the gauged line and stepping off the spaces entirely around the frame, and then locating the centers of the four quarters. This may be tried.

On rectangular frames, it will be recalled that two diagonal strands of cane ran with regularity into each corner hole and that the first four steps ran with equal regularity into all the holes. No such fine arrangement exists when it comes to caning irregular frames. The skill of the workman comes into play here. In Fig. 20

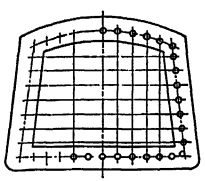


FIG. 18. LAYOUT FOR IRREGULAR CHAIR SEAT

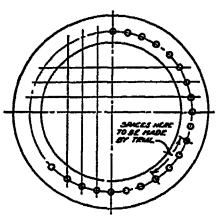


FIG. 19. LAYOUT ON CIRCULAR FRAMES

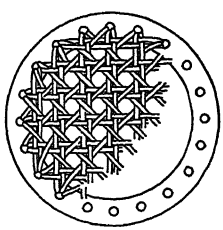


FIG. 20. PARTIALLY CANED CIRCULAR SEAT

is shown a caned circular form. The strands of the first four steps are paired and two each occupy opposite holes. It will be necessary at times to skip a hole or two in order to keep parallel strands an equal distance apart. The drawing does not show this, but the workman must consider it.

Note particularly that the strands of the diagonals run into that hole which keeps the strand in as straight a line as possible. On occasion it may be found necessary to run three strands into the same hole, while some holes may be skipped entirely. A strand should never be turned abruptly to enter a hole. The test of skill here is how well the edges of the panel are finished; that the strands run straight and that they run over or under the right strands.

Five-Step Caning.—Cane weaving of five steps is not common. It may be done in many cases where it will not be subject to hard wear. It is neat in appearance and is much simpler than seven-step caning. The presumption should not be made that this weave will in any way supplant the regular weave, but in instances where decoration is the object, and not service particularly, this weave will prove sufficient and effective.

Fig. 21 illustrates a frame caned with the five steps. The distance between holes was purposely made greater than usual, to

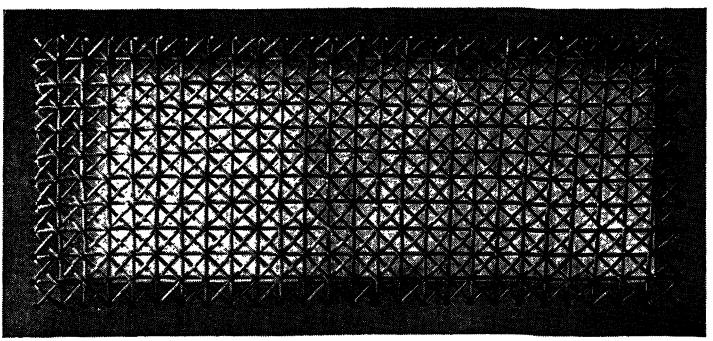


FIG. 21. CANING OF FIVE STEPS

show the weave clearly. The first strands are strung in, in the same manner as described in the seven steps. The second series of strands are interwoven with the first. The over-and-under weave is used. Each alternate row of each series is either over or under. The first diagonal strands run *over* the preceding two series. They are not woven as in seven-step caning. The second diagonal strands run *over* the first diagonals and *under* the intersection of the other strands, including every alternate first diagonal. This resolves itself into simple over-and-under weaving. Note that but one strand of a diagonal enters a corner hole. This is not true of seven-step caning, as elsewhere indicated. It is advisable to utilize a wider cane in the first two steps than is used in the subsequent ones.

The Design Element.—Caning is not a fad. Cane was commonly used in Carolean furniture in England about 1660, and has continued in use for seating purposes through the various subsequent periods. The application of cane, as in panels, is historically wrong. However there can be no valid objection to its use in panels if no attempt is made to name it a true period style. Also it must be conceded that period furniture was not always well designed, and there can be no well-sustained objection to the use of cane in panels,

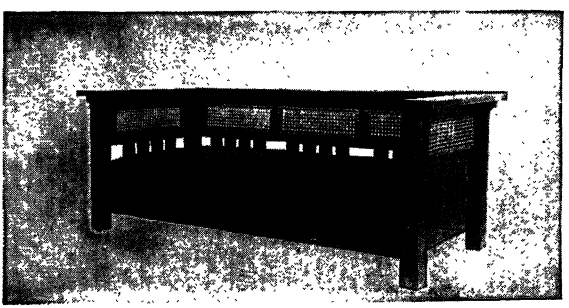


FIG. 22. DAVENPORT WITH CANED PANELS

provided it is in keeping structurally and decoratively with the particular piece of furniture.

The introduction of cane at first was undoubtedly brought about by a desire for something light, substantial, and serviceable, and it blended well with the oak of the period. Cane when used on furniture without doubt adds to the beauty of the given pieces. However, when the decoration is overdone, instead of improving the article, the cane in reality detracts. Properly used, it enriches by breaking up flat, uninteresting areas, and lightening the appearance of otherwise massive, cumbersome articles.

Under proper correlation with wood in school shops it promotes an appreciation of constructive design in which the element of beauty is a prime consideration. It is a practical medium in which

the aspect of design as an element of utility is paramount. It has distinct commercial value, for the boys who have had training in the shops may do chair seating outside and earn considerable money. By such work they come to see a distinct relation between the commercial field and their shop experiences. This is a point of view which is very desirable in present-day industrial education.

Figs. 22, 23, 24, and 26 show pieces of furniture made in manual-training shops by eighth-grade boys. These pieces com-

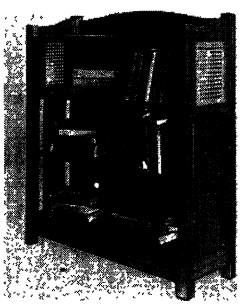


FIG. 23. BOOK SHELVES WITH CANED PANELS

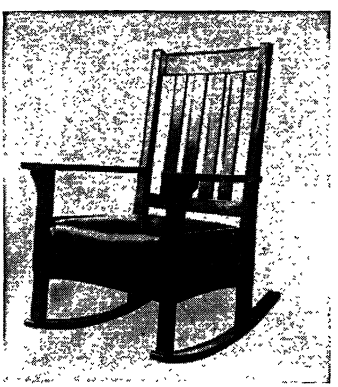


FIG. 24. ROCKER WITH CANED SIDES

prise a group, with the addition of the leg rest shown in Fig. 2, for a library or living room. The cane in each instance adds materially to the artistic effect of the problems; they have tone. The cane forms pleasing groups well related to the wood mass. The cane is natural, the wood fumed and finished flat. The two tones of color are in perfect harmony.

Fig. 25 shows a library table of oak constructed by an eighth-grade boy. The lines are very pleasing and the long, vertical caned panel adds a distinct note to the structure even though purely decorative.

Many modifications of the standard weave in caning are in vogue, but are more or less fads. A "rotary" weave is rather prevalent on certain types of furniture, as is what may be termed the "spider-web" weave. (See Chapter VIII.) These are mentioned merely to suggest that caning is subject to variation. However, the standard weave, of seven steps, will not be supplanted to any appreciable degree, for it adapts itself to almost all types of furniture both decoratively and structurally.

It must not be presumed that the method described in Chapter

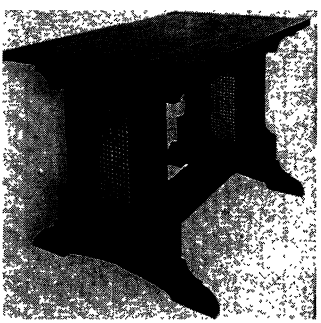


FIG. 25. LIBRARY TABLE

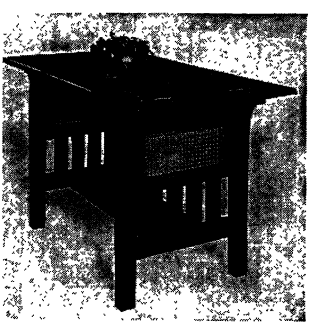


FIG. 26. TABLE; SIDES CANED

I is the only one which may be employed in weaving this standard weave. There are several methods of weaving which arrive at the same ultimate result, but the one described is the simplest, and the most direct, and withal the one best adapted to general use, particularly by school-shop pupils.

CHAPTER III

RESEATING A CHAIR; HAND CANING

In many localities it is impossible to find a professional to reseat caned chairs either by hand or with cane webbing. Many chairs in good repair and worthy are relegated to the attic because of broken or sunken seats. Upholsterers generally will not be troubled with such jobs of caning, for the work does not pay unless there is an amount sufficient to keep them steadily employed. Usually they are not adept enough to do such odd jobs as may come to them, even though willing to do the work, within a time consistent with sufficient money returns.

Chairs of ordinary size may be caned for a minimum of $1 and a maximum of $2. If the holes have previously been bored, much labor is thus avoided, and the charge is naturally made less. The professional cane weaver has various ways by which he determines the cost for recaning a given seat. Perhaps the most common method employed is that of charging so much per hole. This is from 1 to 2 cents. The difficulty in handling very fine cane is also a factor in deciding what to charge. Usually a casual looking over of the chair by the expert is all that is necessary to fix a price. No charge of less than $1 on a hand-caned seat will sufficiently remunerate the worker. Fig. 27 shows a hank of cane and rolls of machine-woven cane.

Any boy who has had instruction and sufficient experience in caning in the manual-training shop may readily undertake jobs of caning. The boy who will investigate will find that he may work up a sizeable trade in chair seating in a short time. In fact, several boys will not overcrowd a given field. Such work will pay the amateur well. He does not nor cannot expect professional wages. It is of considerable value from the pupil's standpoint alone, that is, this correlation with his manual school activities. The amount

of pay initially is not the main question; it is the educational value derived. He would undoubtedly find willing help at his shop at any time a job of peculiar treatment presented itself.

The Process.—Many chairs which the owners would wish hand caned have no holes bored for the work. They previously held machine-woven cane. Fig. 28 shows a sketch of a chair bottom of ordinary or standard shape. The area is irregular. The sketch shows the method of determining the location for the holes.

As stated in the discussion of the seven steps in caning, the holes

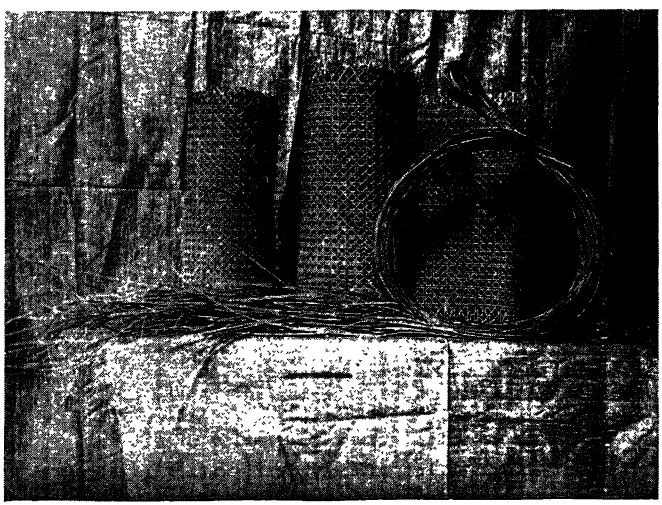


FIG. 27. HANK OF CANE AND ROLLS OF MACHINE-WOVEN CANE

are invariably ½ in. from the inner edges of the rails. In this instance the line from which the holes for the front rail are located is parallel with the front rail; it is coincident with the line on which the holes are bored. The line on the back rail must be parallel with it; the line runs through the center of the center hole. The lines on the side rails are parallel to each other and at right angles

to the first two. These four lines are shown as dash lines on the drawing. Their function is simply to determine the location for the holes to be bored on the lines ½ in. from the inner edges of the rails. Those lines are shown in the sketch as full lines.

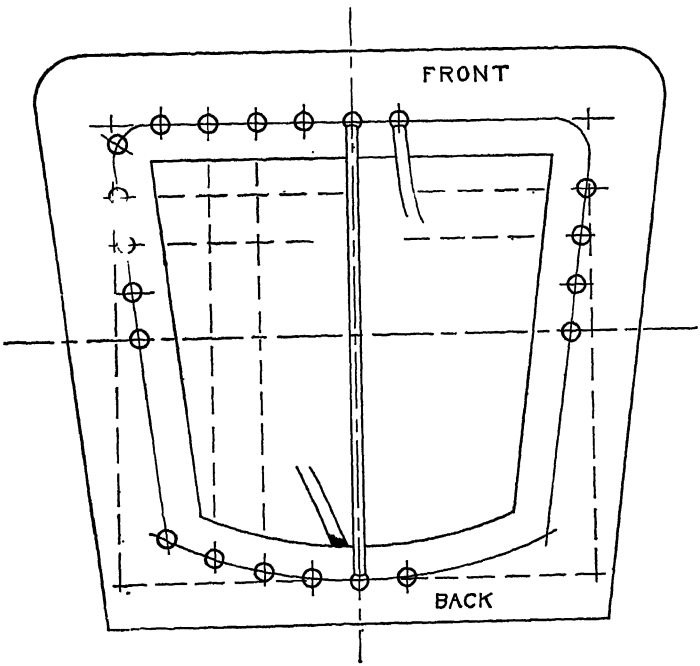


FIG. 28. SKETCH OF CHAIR SEAT OF ODD SHAPE, SHOWING METHOD OF FINDING LOCATION OF HOLES

When the working lines are determined, the centers of the front and back lines are located. The lines connecting corresponding holes on the front and back rails must be parallel to the line connecting the center holes on these rails. This rule applies to the locating of the holes on the side rails. It also applies to any seat of odd shape. The distance between holes will vary somewhat at different

places on the seat frame. This is the result of working to rule, and is necessary to keep strands equidistant and parallel. At times respacing at several places will be necessary. When it is, simply redivide into as nearly the given dimensions as possible.

After the holes have been bored and cleaned the seat is ready for caning. Start at the center hole in the back. Pull the cane up

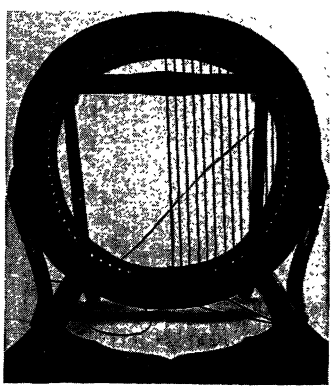


FIG. 29. FIRST STEP HALF COMPLETED



FIG. 30. FIRST STEP COMPLETED; SECOND BEGUN

through this hole and across the frame, and down the center hole in the front. Work both ways on the frame. Fig. 28 shows a cane started in this manner. It is best that the amateur work from the center, both ways. He may begin otherwise when he understands the work better. The caning operations on the seat to be shown are the same as those described in the seven steps in caning. (See Figs. 4 to 12 inclusive.) They never vary. The only new thing involved here is the shape of the seat. Fig. 29 is a photograph of a chair seat of an odd shape, an irregular ellipse. It shows the first step half completed. Note here that the last strand skips two holes, one at the front and one at the back. This is necessary to keep strands

as nearly the same distance apart as possible. Fig. 30 shows the first step completed and the second partially so. It is not necessary to start at the center with this series, although it is advisable with the beginner. Note that two holes have been skipped here, as in the first step. Fig. 31 shows the second step finished and the third under way. These strands run directly over those of the first series. Pegs are always used to keep strands taut. Their proper use has been explained.

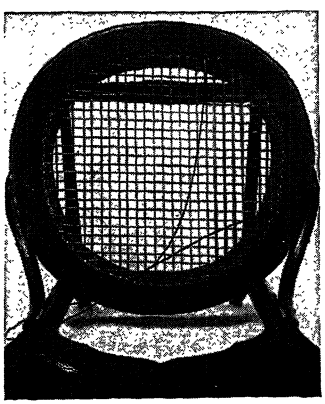


FIG. 31. THE SECOND STEP FINISHED AND THE THIRD UNDER WAY

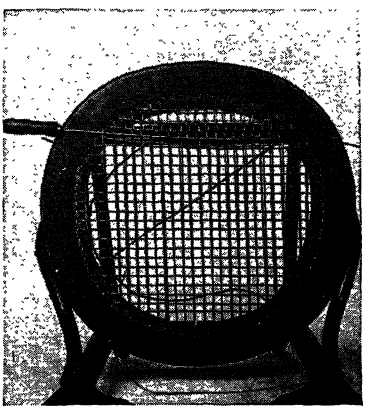


FIG. 32. THE THIRD STEP COMPLETED AND THE FOURTH UNDER WAY; THE CANING NEEDLE IN USE

Fig. 32 shows the third step completed and the fourth under way. This shows the actual weaving, and the method of using the needle. It has been pushed through in the manner previously described; and is shown threaded, ready to be pulled back, thus making the weave. The needle may not be used, but will do the work rapidly. Handwork alone here is tedious. Fig. 33 shows the diagonal weave under way. In Fig. 34 this weave is completed and the second diagonal started. Fig. 35 shows the method of fastening the binder. This has been described.

The first three series of strands should not be pulled very tight;

otherwise the final weaving will prove difficult. The finished seat, when dry, should ring when struck sharply with the fingers.

The method of tying cane, preventing twists, etc., has been explained. Reference should be made to these points, when anything is not fully understood in this discussion of chair seating.

Note that many holes have been skipped in each series, especially in the last two, and also that more than one diagonal of a given

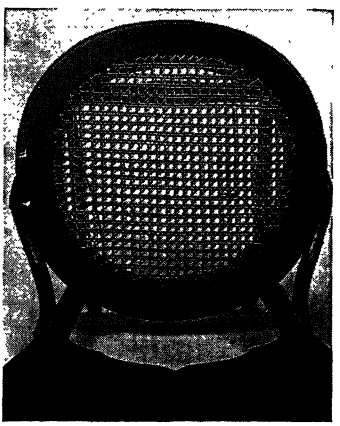


FIG. 33. THE FIRST DIAGONAL WEAVE UNDER WAY; THE FIFTH STEP



FIG. 34. FIRST DIAGONAL COMPLETED AND THE SECOND BEGUN; THE SIXTH STEP

series enters the same hole. In every case it will enter that hole which leaves its course in as straight a line as possible. In rectangular areas it is never necessary to run two diagonals into the same hole, except at the corners. This applies to two diagonals of the same series.

Refinishing.—The refinishing of a chair is a distinct problem, and one which the cane weaver should understand. He should acquire ability for finishing along with skill in caning, inasmuch as a chair which needs a new seat invariably is in need of refinish-

ing. The method is as follows: Remove the cane from the seat. If the finish is in fair condition merely wash the chair with warm water and soap. When dry sand the surface somewhat, wipe clean, and follow with a coat of good varnish. In forty-eight hours rub with pumice stone and oil, and follow with an application of furniture polish, well rubbed. A good polish which may be made in school shops is composed of two parts of raw oil, two parts of turpentine, one part vinegar, and a very small amount of alcohol. Boiled oil may be used in the absence of the raw product. Shake the container constantly when using, for the parts are almost all merely held in suspension.



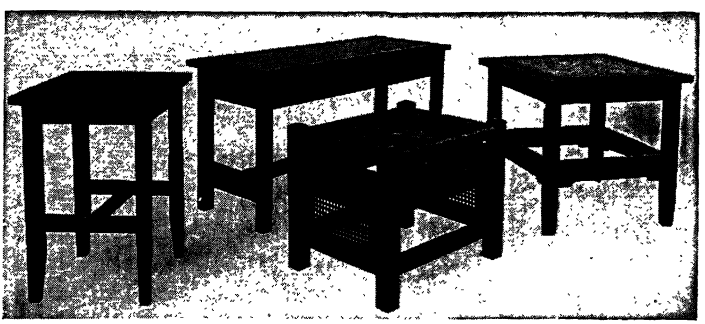
FIG. 35. METHOD OF FASTENING BINDER; THE SEVENTH AND LAST STEP

Should the chair be in poor condition, remove all varnish with any good varnish remover found on the market. Apply as directed with a stiff brush, running the solution well into all crevices. Later rub off the softened finish with excelsior or burlap. A scraper, an old plane bit, or a rather dull chisel will prove effective in corners and recesses. Apply a second coat of remover if conditions warrant it and clean again; then when the surfaces are dry, sand until clean and smooth. Follow with a coat of oil stain of the color desired; then two coats of varnish, allowing each coat to dry 48 hours. Sand the first coat lightly, and rub the second with pumice stone and oil. A filler is not generally necessary in refinishing. The ground coat may be of shellac instead of varnish if the worker prefers it. The chair need not be stained if it was finished natural originally.

In caning the seat, special care must be exercised to avoid mar-

ring the varnished frame. If the needle is used in the fourth step the frame needs protection from it. Pieces of bristol or cardboard may be placed under the needle on either side of the frame. The needle is bound to mar the surface of the frame if this precaution is not taken.

In many instances it is policy to cane the seat after the old finish has been removed; this to avoid any possibility of marring the seat frame later. However, it is better practice to refinish the chair first, and cane the seat last.



SUGGESTIVE PROJECTS

Coloring the Cane Seat.—Cane is very light in color. Sometimes the contrast between a light-colored seat and a darker frame is very desirable. Some may prefer less contrast. In such cases the cane seat may be colored to harmonize with the structure. Apply an acid or a water stain with a brush; then wipe off any excess amount with a clean cloth. When project is dry, apply one or two coats of thin varnish to both top and bottom. The varnish serves two purposes. It prevents the stain from rubbing off on clothing and keeps the seat taut under changing climatic conditions.

CHAPTER IV

RESEATING A CHAIR; CANE WEBBING

The seating of chairs with machine-woven cane is a much simpler process than that of hand caning them. Under similar conditions less time and skill are required on areas of like dimensions. Machine-woven cane, as its name implies, is a manufactured product made on power looms or machines. Commercially it is sold under the name of cane webbing. It is obtainable in widths ranging from 8 in., increasing by 2 in., to 18 in., and in rolls of indefinite lengths. It may be procured in meshes of varying fineness, utilizing cane of various sizes. In specifying open-woven cane it is necessary that the purchaser indicate his wants in essentially this way: Ten feet medium open-woven cane webbing, of No. 1 fine cane, 12 in. wide. A roll of such cane has been referred to in Fig. 27.

Cane webbing may also be purchased in close woven, in both the plain and diagonal weaves. The specifications for purchasing are identical with the open woven except that the term close woven is specified together with the character of weave. Fig. 36 shows cane webbing approximately half size, in open- and close-woven meshes.

As in hand caning, any boy with proper inclination who has had the necessary experience in the shops, may avail himself of the opportunities for seating chairs in his community. The educational and pecuniary advantages are identical to those mentioned in relation to hand caning. The relative ease with which he may acquire skill in handling the materials precludes satisfactory workmanship for prospective customers. The cost of jobs is readily determined, for the amount and cost of webbing is easily ascertained, and experience soon determines the length of time required to complete a given job.

The Process.—The following may be termed the steps in inserting cane webbing. No special difficulty should be encountered in properly seating the frame at the first attempt.

Step 1. Fig. 37 shows a commercial chair seat with groove cut by a router after it has been assembled. There are no angles on the seat. The groove is standard, with dimensions ¼ in. deep and 3/16 in. wide. This groove may be cut by hand with a universal plane and chisel before permanently assembling the parts. In fact, this is a necessary procedure in grade schools and other schools where special machine tools are unavailable. The necessary tools for pressing in the webbing lie near the frame, Fig. 37. These are a small mallet, a chisel, and several hardwood wedges. The wedges,

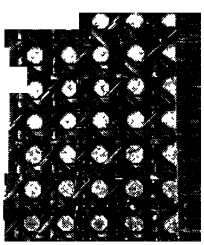


FIG. 36. OPEN- AND CLOSE-WOVEN CANE



FIG. 37. THE SEAT FRAME WITH WEBBING AND TOOLS

made in several widths, to enable them to enter the groove at the abrupt curves, are 4 in. long of ¼ in. stock, tapered to ⅛ in. on the faces.

Step 2. The cane should be boiled in water for a minute or so or allowed to soak for several minutes in warm water until thoroughly pliable. Then lay it on the frame and cut it to the shape of the seat, allowing half an inch excess around the entire piece. A pattern of card or bristol board will prove of material assistance to the amateur as well as to the expert. The front line or edge of the

pattern must run parallel with the horizontal or vertical strands of cane. Pull out all weavers at the edges of the piece of cane where they run over and parallel with the groove. Then lay the webbing over the frame, and see that the weavers run parallel with the

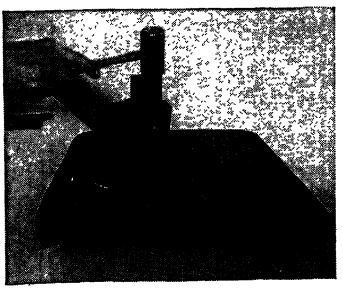


FIG. 38. INSERTING THE CANE WEBBING

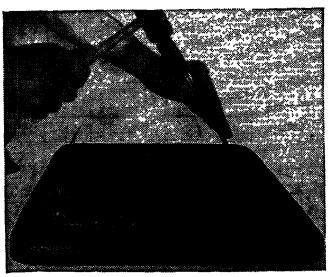


FIG. 39. TRIMMING THE EDGES

front of the frame. With wedge and mallet as illustrated in Fig. 38 begin at the front and force the webbing into the groove. Insert on the opposite side next, then the other two sides in order. The curves may be done last.

Step 3. The edges of the webbing will project up beyond the groove. These are cut off as illustrated in Fig. 39 by means of a mallet and chisel at the outer edge in the bottom of the groove. Run either liquid or hot glue into the groove. An oil can with large-holed nozzle is excellent for this purpose. The liquid glue should be heated if used in this way, so it may flow easily. This glue is to be recommended for the amateur in that no great haste is required as in the case with hot glue. A small, stiff, round brush will serve the purpose very well in absence of the oiler.

Step 4. Fig. 40 shows the method of inserting the spline. Splines may be had either of wood or reed, are curved on the upper edge and wedge shape in cross-section. They are standard in width and thickness and will fit a groove of the size indicated in *Step 1.*

Fig. 41 is a freehand sketch of a spline, showing particularly its shape in cross-section. Wood splines, preferably of hickory, may be purchased in 5 ft. lengths, and reed splines in lengths of 8 or 10 ft. Both hickory and reed are recommended because of their pliability and ease in handling. Steam or soak them in hot water until thoroughly pliable; then insert in the groove as illustrated. Note that the joint is made at the rear of the seat. The mallet used is of rawhide and will not mar the spline. A wooden mallet of small size is a satisfactory tool. Cut off the extra length of spline with the chisel, force the spline down nearly flush with the frame with mallet and wedge, sponge off the excess glue from the surface, and allow the webbing to dry.

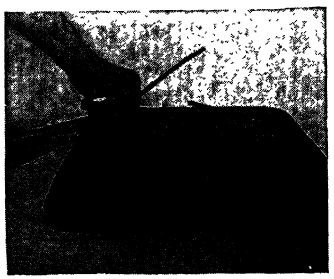


FIG. 40. INSERTING THE SPLINE

Step 5. The finished seat is shown in Fig. 42. As the cane webbing dries it becomes taut, and irregularities of the surface, if not too pronounced, will disappear entirely. Therefore, the worker need not consider them primarily. Light sanding of the cane when thoroughly dry will eliminate the small, hairlike projections on the surface. Singeing the surface with a blow torch or gas flame will do the work more effectively, but great care must be exercised to avoid burning the webbing itself. The singeing must be done rapidly and the flame not be permitted to remain at one spot more than an instant. Dampen the surface to minimize the danger of burning.

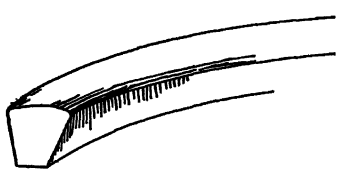


FIG. 41. SKETCH OF A PORTION OF A SPLINE

The chair shown in Fig. 43 was made by an eighth-grade boy.

The slip seat is upholstered, and a panel of cane webbing utilized on the back. In instances of this character, where the area is rectangular, splines are cut, mitered, and fitted previous to inserting the webbing. The splines are used dry. Manufacturers, in instances where the seat area is all curved, generally fit the pliable spline, allow it to dry, and then insert it with the webbing. This assures tight joints. This procedure is not recommended for the ordinary shops, for the simple reason that the shrinkage is not appreciable.

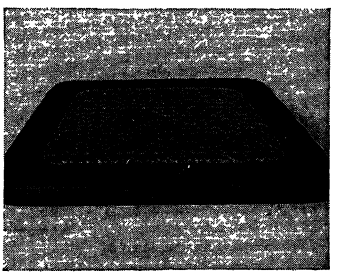


FIG. 42. THE FINISHED SEAT

The frame illustrated in Fig. 44 is purely supplementary to the steps, but it may be used in demonstrating the processes to classes. It materially assists in making the processes clear to the students, previous to allowing work on their projects, and assures a general understanding, at least, of proper procedure. The different panels are lettered for convenience and need no elaborate explanation:

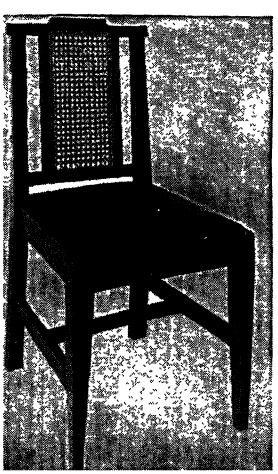


FIG. 43. CHAIR WITH CANED PANEL

A is the open frame with grooves cut for the webbing.

B is the webbing inserted with ragged edges exposed, ready for cutting.

C is the webbing with edges properly trimmed and a spline inserted.

D is the completed panel.

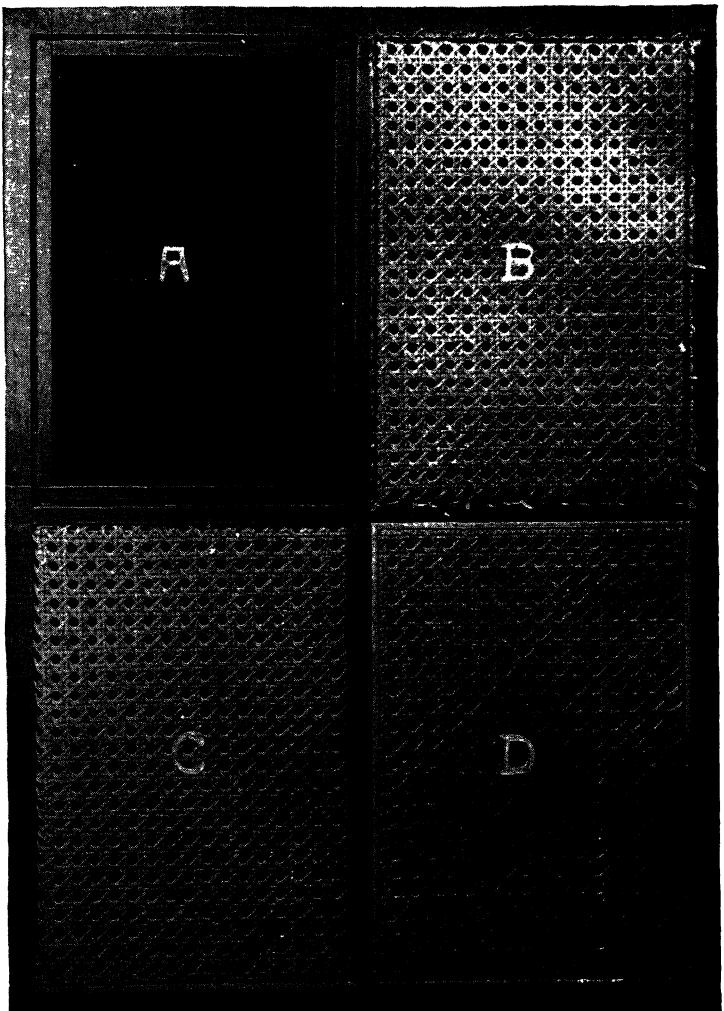
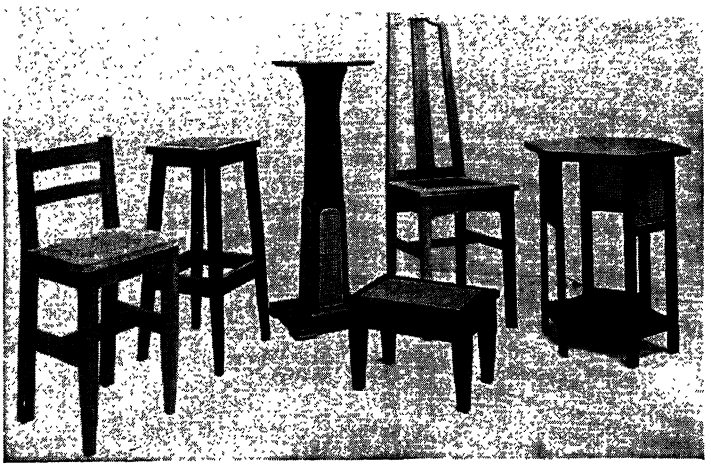


FIG. 44. FRAME ILLUSTRATING STEPS IN INSERTING WOVEN CANE

Inserts of cane webbing may be utilized on pieces of furniture other than seats. These inserts could be used on every article illustrated in Chapters I and II, with similar pleasing effects, and with less labor. However, there is an obvious element in hand caning which naturally and logically gives it precedence over the inserted cane.



SUGGESTIVE PROJECTS

RUSH SEATING

Rush seating, employing either genuine rush or substitutes, may be done to good advantage and with excellent results in manual-training shops. No equipment is needed to maintain such work. The addition of a woven seat to a chair or stool constructed in the shops will necessarily employ a new, interesting medium in conjunction with woodwork, and materially increase the pupils' knowledge of materials and possible combinations. And, as with caning, the resultant interest in the work at hand more than justifies its introduction in manual-training shops. Rush seating employs a very simple weave. Different materials employed in weaving naturally require different degrees of skill, and the difficulties encountered are those resulting from handling materials and not because of the complexity of the weave. One may very readily undertake the rushing of ordinary seat frames after a study of printed directions and illustrations. It should be understood at the outset that, in discussing rush seating, materials other than genuine rush are included in the term.

Historical.—In the British Museum in London is a seat of curious shape of Egyptian manufacture, which, it is estimated, was made previous to 4000 B.C. A small amount of rush still clings to the seat frame. The relative date of the construction and weaving of the chair seat would indicate that rush seating is by no means a modern art.

The use of rush in England dates no earlier than 1720. Several types of chairs were made there between that date and 1870. In France rush was used extensively in the seating of furniture of Normandy and Brittany about 1750. Flanders produced rush-seated chairs at an early date, and many were constructed in this country

in early Colonial days, prior to 1776, as well as later. Such chairs were undoubtedly patterned after those brought over from Holland, France, and England to the early settlements in America both before and after the Revolutionary War.

In early times rush always served a function in the seats of chairs and stools, and was very seldom if ever used on the better class of furniture. The use of cane or rush on furniture for decorative purposes only is distinctly a modern idea. Utility rather than beauty prompted the introduction of seats of rush.

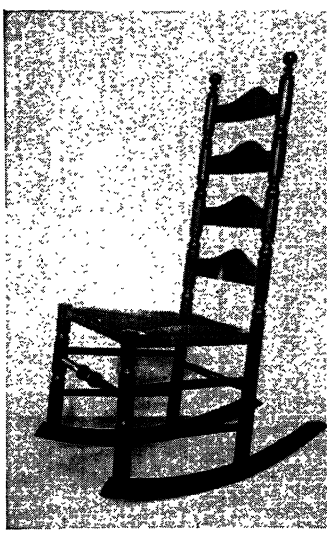


FIG. 45. ADAPTATION OF LADDER-BACK CHAIR

Modern furniture of excellent design and workmanship employs rush seats. These are either woven over a separate frame and inserted or are an integral part of the chair, being woven over the seat rails of the chair itself. Fig. 45 shows an adaptation of a ladder-back chair with rush seat. The rush on this chair is woven over the rails. Fig. 46 shows a flat view of the seat.

Rush.—Rush is the name applied to many fistular, stemlike plants of similar or like growth. Properly, rush belongs to the sedge family. The different species vary greatly in appearance; some are low and slender, some are tall and leafless, and some are broad leaved. They are found in wet places throughout the northern hemisphere, along banks of sluggish streams, and in lowlands and marshes. The great bulrush is common and familiar, while the chairmaker's rush is not so well known. The plants most commonly known as rush are called by the names of flag and cattail. In fact,

flag and cattail are very generally used for rush seating. The technical names of the different species of rush are not pertinent or desirable here.

Other Materials.—Materials other than rush may be used for rush seating, as has been stated. Rush is rather hard to manage in that no appreciable length may be handled because of the shortness of the leaf. Twisting is necessary. Fiber, or similar materials, are to be recommended for shop use because a great length is procurable, and the twist is made. It is made of machine-twisted paper,

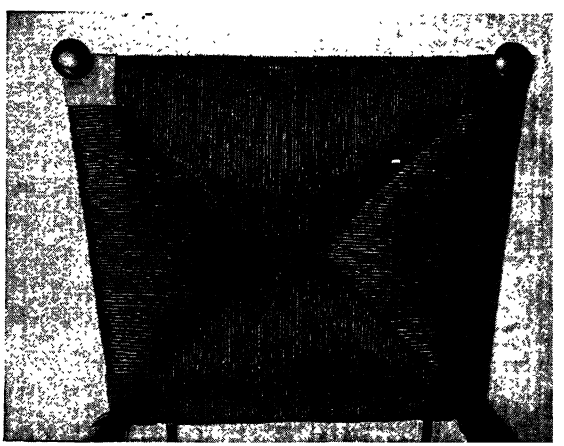


FIG. 46. SEAT OF LADDER-BACK CHAIR

and comes in long, indefinite lengths. It is tough, strong, and serviceable, and procurable in spools of about one hundred pounds each. Fig. 47 shows such a spool together with a bundle of rush. It is manufactured with or without a flexible wire center. It may be had in several colors and sizes.

Raffia is well known through its general use in basketry and allied work. In rush seating it has no conspicuous place, although it may

be utilized to great advantage. Raffia is the leaf of a certain palm, cut in narrow widths and varying in length from 2 to 5 feet. It is bought in hanks by the pound, bleached or unbleached, and in colors. The hanks should not be untied, but as strands are needed they should be pulled out from the head end of the hank. If improperly handled, raffia will become badly tangled.



FIG. 47. SPOOL OF FIBER AND BUNDLE OF RUSH

Corn husks, taken from close to the ear, may be used, particularly for seating chairs of toy furniture. The husks near the ear are not so coarse and brittle as those outside. The shortness of the husks precludes their general use, although they produce an excellent seat when properly woven.

The materials mentioned by no means exhaust the list of available mediums for rush seating, but will give considerable and sufficient variety for shopwork. As the weaver comes to appreciate the limits and advantages of the various mediums for certain grades of work, he may utilize local plants and grasses suitable for such work.

Preparation of Materials.—Rush—and in the term are included cattail and flag—is common to almost any locality in our northern states. It should be gathered when full grown and still green. It is ready for cutting when the tips of the leaves begin to turn brown. This is usually about the middle of August. The leaves are tied in loose bundles for convenience in handling, and dried in the shade,

preferably a darkened room. They should remain here until thoroughly dry. Before using, soak the rush about ten hours in water. Less time is required if warm water is used. When it is soft and pliable it is ready for weaving.

Before weaving, the butt ends of the leaves are cut off about a foot from the base. These are too stiff and coarse to weave properly. One leaf may be used, or two leaves may be twisted together, to make a strand. Three leaves make a coarse strand, two a medium, and one a fine strand. A long, tight twist is necessary to produce an



FIG. 48. METHOD OF WEAVING THE FIRST STRAND

even, smooth strand. The twisting is always done in one direction. One leaf is recommended for beginners in rush seating, for adding to one is much simpler than adding to several. The under side of the seat need not be so smooth and so well woven as the top. In fact, twisting need not be done underneath at all unless the individual worker so desires.

Raffia is easy to manipulate because of its pliability, even when dry. Several lengths will need to be twisted together to produce a strand of sufficient size. It requires little soaking to make it ready for use. Raffia produces an even, smooth surface of pleasing appearance, and is very desirable in a seat.

Fiber may be woven as it comes from the spool. However, it is better to dampen it by plunging a quantity in water and removing at once. When it dries after weaving, a slight shrinkage results, thereby making a tauter seat than could be woven with dry strands. Inasmuch as the fiber is paper, it cannot be soaked in water.

The Weaving Process.—With the frame ready and rush in proper condition the weaving may be started. Fig. 48 shows a drawing on which the corners and rails are lettered and numbered, depicting graphically the method of weaving the first strand. The arrows indicate the direction of weave. The operation is practically complete once around the frame.

Start arbitrarily at any corner—in this case, *A*. A strand of rush



FIG. 49. STICK FOR STUFFING INTERIOR OF SEATS

tightly twisted is laid over rail 1 next to the cap with its short end turned down. The beginner may find it advantageous to tack the end in place. Draw the strand over the edge and bottom of rail 1 and up at the inner corner, then over the top and edge of rail 2. This binds the loose end in place if it has not been previously tacked. Pull the strand directly across the frame opening to the top of rail 3 at corner *B*. Draw it over the edge of the same rail and under, then up at the inner corner and over the top and edge of rail 1. Pull directly across the frame opening to the top of rail 4 at corner *C*. The operations at corners *C* and *D* are identical to those at *A* and *B*, and these repeat themselves indefinitely at each corner, or until the seat is completed. This applies to square seats only. The end of the last strand may be secured with a tack under the proper rail, or twisted around a strand underneath the seat.

The strand is twisted as the weaving progresses. This may be

done with the palm of the hand and thigh, in much the same manner as a shoemaker waxes his thread. If one leaf of rush is used to make the strand, new leaves are added by tying the two ends in a square knot at a corner, or wherever such joining will not show on the finished seat. When more than one piece of rush is used for a strand the pieces should be of uneven lengths initially. One leaf or

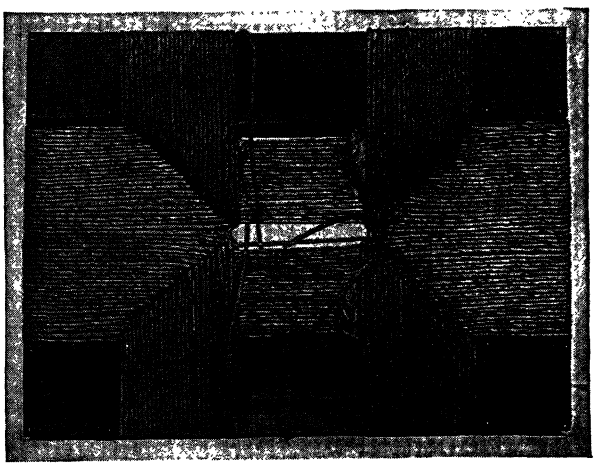


FIG. 50. METHOD OF FILLING IN CENTER

piece at a time is then added. The upper or top end of the leaf is used to begin the seating and each leaf added is attached at its top end.

Some expert rush seaters do not tie knots in making strands, but add leaves by twisting the end of the preceding leaf about the added one, "like the color on a barber pole," as one old rush weaver remarked. Adding by twisting only is difficult, and requires great patience and dextrous handling of the material. In fact, rush should be used by the more skillful boys only. Others may use the excellent substitute, fiber.

Care must be exercised to keep the strands from overlapping improperly at the corners. The strands should fit snugly where they go over the rails. To insure this, tap them sharply with a mallet used over a block of soft wood. This may be done at frequent intervals or when several strands have been woven over each rail. Uniform tension on the strand is desirable and this should be tight.

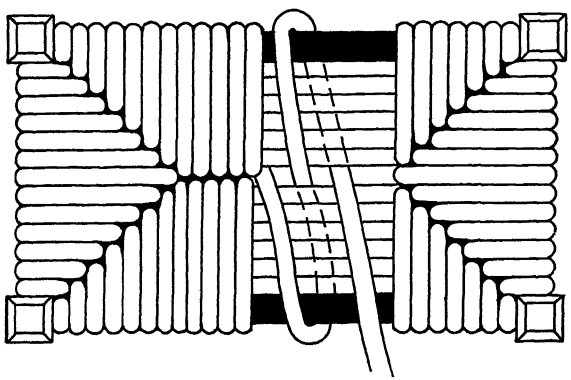


FIG. 51. METHOD OF FILLING IN CENTER

As the work progresses the interior between the upper and lower rows of strands is stuffed. This is done with the same material as that used in the weaving. The butt ends of rush are used to stuff the seat of rush; raffia is used to stuff a raffia seat; craft paper to stuff a fiber seat; and so on. The packing should be done in a thorough manner, for it builds up the seat and prevents its breaking down at the inner edges of the rails, and sagging with continued use. A slightly curved hardwood stick about 12 in. long may be used to advantage to do this work. Fig. 49 shows a sketch of such a stick. It is ¾ in. in diameter at one end and tapered to ½ in. by ⅛ in. at the other. Considerable force needs to be exerted in packing, and caution used to avoid breaking strands.

Rectangular Seats.—As stated, in weaving a square seat the initial process is repeated at all corners until all openings are filled. In rectangular seats the spaces on the short rails will fill before those on the long rails. Weaving around corners is then manifestly impossible. Fig. 50 shows a partly woven seat with the short rails

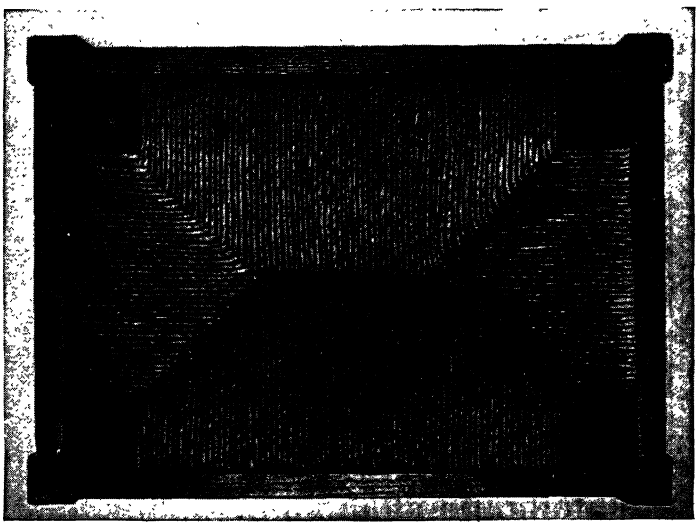


FIG. 52. COMPLETED TOP OF FIBER

filled, and the process of filling up the remaining area under way. The method is this: Go over and under a long rail, across half the frame opening and up through, then across the remaining distance, and over and under the other long rail. Repeat until the seat is completed. Fig. 51 is a sketch of a partly woven seat, illustrating the method of filling in the center just described. It supplements the photograph and makes the method clearer.

It should be noted that the strands in crossing at the center must be compressed one half of their diameters. They will need to be

tapped sharply with a small mallet or hammer to produce proper crowding. Fig. 52 shows a stool seat of fiber woven by an eighth-grade boy. Fig. 53 shows the complete stool. The seat is woven over a separate frame and inserted. Fig. 54 is a child's chair of oak, with a seat of fiber woven over the rails of the chair.

Irregular Frames.—So far, only the square and rectangular frames have been considered. The usual seat, however, is what is known as an irregular one with flare front. A seat with the front rail longer than the back rail is shown in Fig. 55. To seat this frame, first mark off a distance, B, on the front rail equal to the length of the back rail. Do this by placing the beam of a framing or large try square against the front rail and allowing the blade to butt against the inner edge of the corner of the back rail. This produces a rectangle in the center and locates A, as shown on the sketch. This is actually one half the difference between the lengths of the front and back rails. This distance may also be computed without the aid of a square.

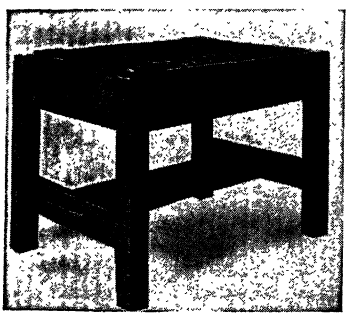


FIG. 53. COMPLETED RUSH-SEATED STOOL

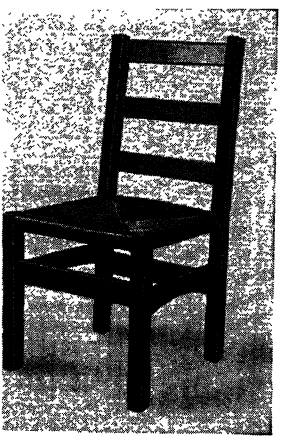


FIG. 54. CHILD'S CHAIR WITH FIBER SEAT

To seat this frame tack a strand to rail 1, then proceed around corner X and across the front of the frame to corner Y. Proceed around this corner and tack the strand to rail 3. Cut off the remaining length. Begin at rail 1 again and repeat the process just described until the spaces marked A are wrapped. When these spaces have been filled, wrapping continues in the regular manner around the four corners, as described for the rectangular frame. In Fig. 56 are two sketches which show clearly how the two corners

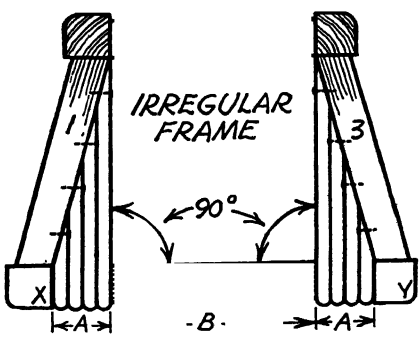


FIG. 55. LAYOUT OF IRREGULAR FRAME FOR RUSH SEATING

of irregular frames are wrapped. These are given to aid the workman in connection with the mechanical sketch.

Finishing the Seat.—The finished seat of fiber should be given several successive coats of fine-grade elastic varnish. The varnish also serves as a binder to hold the strands in place. When the first, and perhaps also the second, coat of varnish is also still "tacky," it is a good plan to even up the strands of the seat so that when the varnish sets they will be held firmly in place. Apply a coat of varnish at twenty-four-hour intervals. Continue until no dull areas

remain on the surface. If the seat has been well wrapped, it should give years of good service. In fact, it should last as long as the chair itself if it is given an occasional coat of varnish. Rush and raffia are finished in the same manner.

Child's Chair.—Fig. 57 is a working drawing of the child's chair which, if properly constructed, should give a generation of service. In fact, the author has several chairs identical in design which have given years of fine service and show little sign of wear. The seats have been refinished several times. This chair is preferably made of white oak. It may be stained and finished to suit individual preference. The sketch accompanying the drawing shows

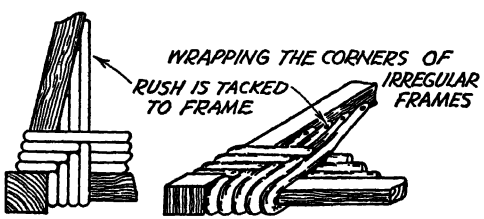


FIG. 56. METHOD OF WRAPPING CORNER OF IRREGULAR FRAME

how the two slats may be bent over a wooden form. This form may be cut from any waste hardwood and the curve cut with a slightly shorter radius so as to allow for the natural springing back of the slats. The slats should be thoroughly steamed or boiled and should be placed over the form right after they are taken from the bath. The drying should not be forced. The back may be provided with a single formed slat instead of the three suggested, if the workman so desires. The height of the seat may be varied to suit the individual child. The seat frame is square. If a flare front is made, it complicates considerably both the construction and seating.

Pertinent Suggestions.—Fiber and other similar materials are procurable in spools with the strands exceedingly long. Therefore, for convenience in handling, about a twenty-foot strand may be cut, which is then looped and held with a strong rubber band. The strand is then unlooped a little at a time as the weaving progresses. The strands of rush, raffia, and like materials are relatively short, and no such expediency is needed.

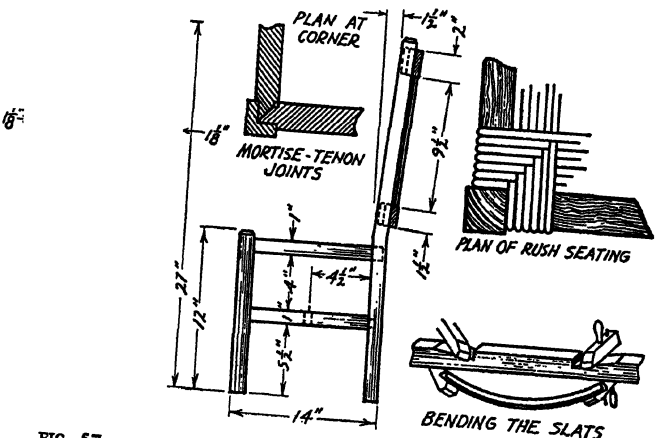


FIG. 57. WORKING DRAWING OF CHILD'S RUSH-SEATED CHAIR

All materials for weaving are readily obtainable from supply houses, even in many smaller communities. Rush may be gathered in the lowlands in many localities if the instructor so desires. Gathering and curing such materials, where possible, is to be encouraged.

CHAPTER VI

REED AND SPLINT WEAVING

Reeds which are used extensively for basket making and weaving in general are procured from the species of palm described in Chapter I. These reeds should not be confused with the term reed applied to several distinct species of large, water-loving grasses. Such reeds are usually designated under the name of grasses. There are a thousand species of palm distributed over the tropical regions of the entire world, but only a few are native in the United States, and these are of no distinct commercial value. The rattan or cane palms of India and the Malay Islands grow to an unusual height, and are imported to this country in great quantities. These rattans and the trailing palm of the species *Calamus* have as main export centers Singapore and Calcutta. These palms are stripped of leaves and bark and split into round and flat strips of different diameters and widths. The outer bark, when stripped into proper sizes, is known as chair cane; the entire palm, with leaves removed, is commercially known as rattan; and the flat reeds are frequently sold as flat rattan and pith cane. Inasmuch as these flat and round strips, split from the palm plant and exported under the name of rattan, are called reeds, we shall refer to them under that name in all discussions to follow. There are two qualities of reed on the market sold under the names of China reed and German reed. The former is inferior in quality and the latter is superior, being strong, tough and durable.

Primitive Methods.—Briefly the primitive process of converting the rattan, or raw material, into cane and reeds, or the finished product, is this: The rattan stems are thoroughly dried or seasoned, and the nodules are pared off with a peculiar native knife. Then the rattan is sorted into sizes and selection made as to grade. The sorting is based upon external color and diameter of the rattan. The

rattan is then immersed in water, and the stem is rubbed vigorously with sand and cocoanut husks to remove dirt and foreign substances. It is then bleached by means of sulphur fumes, either in the stem or after the peel and core have been prepared.

The method of preparing the peel and core is this: The peel, or outer covering, is removed with a heavy knife; it is then stripped to selected thicknesses and widths by drawing it by hand through two knives set at required distances apart. This peel is commercially called cane. The core is then stripped into as many strands as necessary, depending upon the diameter of the cores required. These are rounded by drawing them through a sheet of tin or iron perforated with holes of different diameters. The rounded cores are called reeds.

Considerable rattan is still converted into the finished products by hand processes through these laborious stages. Machines have been perfected which do practically the entire work. Particularly have the Germans brought this industry to a perfected state. Still in various sections of India, China, and the Philippines hand working of rattan is a thriving industry; an industry seemingly peculiarly adapted to the natives. The Philippine method of preparing the raw material varies somewhat from the Chinese method in that the natives do not bleach the rattan.

Reed may be procured in large or small hanks, in coils and in bundles, with the cost determined by weight. Schools generally will find it advantageous to buy it in small hanks, because of ease in handling and for economic reasons. Round reeds are shown three-fourths size in Fig. 58, from No. 0 to and including No. 7, also winding, half-round, and flat reeds. Winding reed is thin and slightly rounded on one surface. Half-round is as its name implies. Flat reed may be obtained in several widths from ¼ in. to ½ in., and, if of good quality, one surface will show a decided bevel on the edges and appear much smoother than the other. Thus the right side is determined. There are many more sizes on the market than

are indicated in Fig. 58, but those shown should supply adequate, if not liberal, variety for the ordinary school shop. The cost of reed cannot be given with any degree of accuracy at present. The price is determined by the quantity bought, and by the quality and size.

Bleaching.—Reed is procurable either bleached or unbleached. Ordinarily it is better to buy the bleached product. However, if the worker desires to bleach the reed, the method for small quantities is as follows: In a tub two thirds full of water dissolve ten pounds of chloride of lime. Immerse the reed in this solution, weighting it down to insure covering it all, and let it stand about four hours. Remove it from the tub and wash thoroughly in running water. The best way to do this is to lay the reed on an inclined surface and turn a forceful stream of water upon it. Chloride of lime has a bad effect upon the hands in that it makes them sore and tender, so care must be taken to properly rinse the reed. A little tallow rubbed over the hands will materially offset the tendency to tenderness, and generally keep them in good condition.

Staining.—Bleached reed takes stain much more readily and evenly than does the natural or unbleached. It may be stained any color with prepared stains, but ordinarily these leave the reed muddy in appearance, due primarily to the difficulty in brushing in or wiping off the stain in the recesses which weaving leaves. Perhaps the best agent for coloring reed, and at least a very desirable one, especially after it has been woven, is naphtha. The preparation of the stain and the process of coloring are as follow: Obtain the necessary amount and variety of colors ground in oil; mix the required colors with a little naphtha; then, to determine the shade of color, test with a reed. Reed absorbs a given amount of color, therefore the shade will prove out practically the same when tested with a small quantity of naphtha as when tried out with a greater amount. Add the required amount of naphtha to the solution, avoiding thinning too much; otherwise the color produced will be "sickly" in appearance. Five pounds of color to about three gallons of naphtha

will prove about the right ratio. For instance, to obtain a rich nut brown, mix one pound of chrome yellow and five pounds of burnt umber with a small amount of naphtha. Stir until the colors are liquid, then gradually add four gallons or so of naphtha, and stir well. The intensity of the brown may be varied by using more or less chrome yellow.

Coiled hanks of reed may be immersed in the solution, immediately withdrawn and hung to drain dry above the receptacle, thus permitting surplus stain to drain back into it. The stain may be

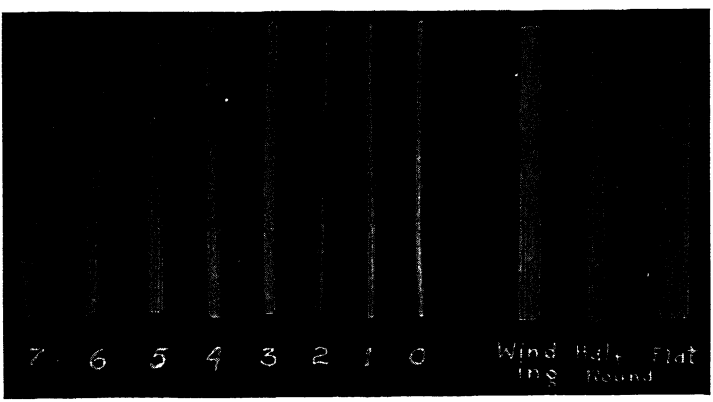


FIG. 58. SPECIMENS OF REEDS, THREE FOURTHS OF ACTUAL SIZE

used repeatedly, and as it is very volatile it should be kept in a tightly corked red can when not in use. It is also highly inflammable, and should be used in a room in which there is free circulation of air. If colors have been mixed properly and thinned to the right consistency, the reed will dry rapidly and the color will be sharp and clear, free from muddy effects.

A woven article such as a basket or woven top footstool may be dipped, or the color poured over and allowed to drip dry. In some instances it is good policy to wipe surplus stain off lightly. Then, in the case of the footstool or similar project, if the worker so desires,

he may stain the wood a darker shade than the top with a prepared stain. Reed is very effective without stain; many of the stools shown herewith are left natural. Reed may be shellacked or varnished. Because of its porosity, it soils very easily unless some finishing agent is used, and a good grade of elastic varnish is recommended as a finish, especially when the woven article is subject to severe use.

Other Materials.—Reed is not the only good medium adapted to weaving, either in correlation with wood or when used alone. On the stools illustrated, several other materials have been used, as inner

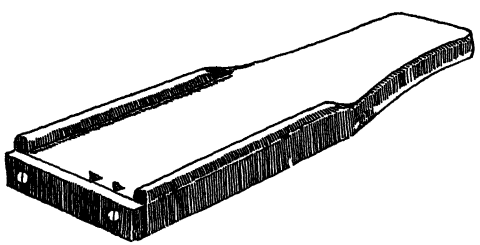


FIG. 59. SKETCH OF HAND STRIPPER AND GAUGE

hickory bark and Indian splints and fiber. Binding cane, rope, and even willow may be utilized with success. Paper fiber was discussed in detail in Chapter V and needs no elaboration. Fig. 72 shows a stool partly woven with this serviceable material. Sufficient to say that this fiber adapts itself admirably to almost all work where reed is commonly employed, and in many instances is, commercially, supplanting reed.

Inner hickory bark may be obtained of manufacturers of rustic furniture either directly or indirectly. They may be obtained first hand if hickory trees grow in the locality, thus enhancing the educational value of weaving. In the spring or early summer when the sap is up and the bark slips easily, a hickory tree may be cut down, and the rough, outer bark shaved with a drawknife from the top of the log the full length of the trunk, leaving a surface from 8 in. to 10 in.

wide. With a heavy knife split the inner bark on either side of the shaved strip; then beginning at one end peel back the inner bark the full length of the log. This process may be repeated until the log is stripped. The thickness of the inner bark depends upon the size of the tree and the species. Manufacturers of hickory furniture claim that the pignut possesses a thicker bark than any other species, the bark running from 1/4 in. to 3/4 in. in thickness, and they accordingly use this tree in preference to others when available. The

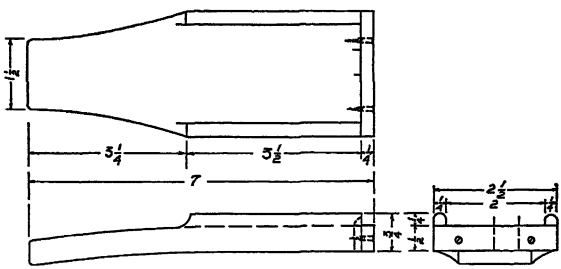


FIG. 60. WORKING DRAWING OF HAND STRIPPER AND GAUGE

rolls of thick inner bark are allowed to dry for several weeks. Then they are placed in water, to remain until pliable. They are then split into strips of proper thickness and width. Factories use a very simple motor-driven machine for making the strips, and any manual-training shop can devise some scheme for accomplishing this work. These strips cut in indefinite lengths must be made pliant by a thorough soaking just previous to use. In weaving they should be pressed close together with the fingers or with the aid of a hammer, as there is an appreciable shrinkage especially in their width upon drying. Such strips are used mainly by builders of rustic outdoor and porch furniture for the weaving of the backs, arms, and seats of chairs, and have at present no general use in school shops. Their use here should be encouraged. They are put up in coils, and are 3/4 in. wide and 1/16 in. thick. They may be stripped into narrower widths by means of a hand stripper, soon to be described.

Indian splints of ash and hickory may be obtained from dealers in the raw products. These strips are cut from the wood of the tree in long shavings in a manner similar to obtaining the inner hickory bark, and stripped into desired widths and thicknesses. One kind of ash splint is made in three weights or thicknesses—fine, medium, and heavy—and in strips 1½ in. wide. It is sold in coils of 200 ft. each. The strips are a number of feet in length. Hickory splints are sold in coils of a dozen strands each. These strands are 8 ft. to 10 ft. long by ½ in. wide, and slightly less than 1/16 in. thick. A coil weighs about three fourths of a pound.

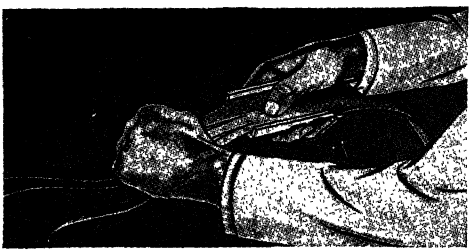


FIG. 61. HAND STRIPPING SPLINTS

The ash splints, particularly, need to be restripped to widths needed by the worker. For ordinary purposes the hickory strips are right for seating purposes. The stripping is done by means of a combination hand stripper and gauge shown in Fig. 59. A working drawing of it is shown in Fig. 60. It is made of maple preferably. The cutters are of a watch spring, pointed and sharpened as indicated. The end piece is removable to permit changes of the cutters. To use, merely hold the splint flat between the right hand and stripper, press the strand down on the cutter, and pull it across the cutters with the left hand. Two persons may do the operation more readily and speedily than one. It is a good policy to make several of these devices with cutters at different distances apart so splints of various widths may be cut without resort to a change of cutters. Fig. 61 clearly shows how the operation of stripping is done by one person.

Splints need to be soaked in water for a number of minutes before

using. They will be found to be somewhat less pliable than inner hickory bark, and different in color, varying from almost white to a light brown. Inner bark is a nut brown in color. The splints stain well, and may be dipped in identically the same manner as reeds. Inner bark needs no stain; in fact, is more pleasing if left natural.

Ash splints are extensively gathered and prepared by the Indians in certain sections of Canada and the northern states. There they are woven into baskets of intricate design and beautiful colors, usually in combination with other materials, as sweet grass. Splints may be used for almost every purpose for which flat reed is utilized, and in numerous cases is superior and preferable to reed.

In Fig. 62 is shown in order two rolls of hickory splints, a bundle of inner hickory bark strips, and a small hank of flat reed. These are in the original bundles as they come from the dealers.



FIG. 62. ROLLS OF SPLINTS, INNER BARK, AND REED

SEATS OF REEDS AND SPLINTS

The discussion of the weaving processes to follow is confined, in the main, to stools or seats. Fig. 63 shows several stools different in design both in wood construction and in weaving. In two instances it will be noted that weaving is done over a separate frame, one being inserted between the rails, the other fastened on top, leaving a little projection. Reference is made to several possible weaving designs and the use of various mediums and combinations. The possible combinations of materials are merely suggestive of possible others, and the individual worker will find that many designs of varying complexity may be worked out. An excellent method for working out possible designs is that of using black-and-white paper strips ½ in. in width. The design will show up very clearly because of the contrast of the black and white. Experimenting with the weave on the seat itself is rather tedious and unsatisfactory. The paper strips are an excellent means to an end.

The stool top illustrated in Fig. 64 employs a simple over-and-under weave, utilizing flat reed. The worker needs to decide at the outset on the character of weave to be used, unless it be of unusual design. In this instance the weaver runs over *three* and under *three* strands, and the wrapping done in a series of *three*. To begin the operation, tack an end of flat reed under a short rail at a corner, then bring the strand out and over the rail, across the frame opening to the opposite rail, under this rail, across underneath the frame opening to the bottom of the first rail. This completes the process once around. Repeat three times; then wrap the strand around the two rails, without running it across the top. Thus every fourth strand across the top is omitted. It is not necessary to cut the strand; the wrapping is continuous. Repeat these series of three strands until opposite short rails are entirely wrapped.

When a strand runs out tack the end with the beginning of a new one underneath a rail. Use a one-ounce, flathead wire tack for this purpose if available; otherwise a one-ounce cut tack will do. The weaving proper now begins.

Tack a strand underneath a long rail at a corner, then weave *over three* strands and *under three*. Repeat in the same manner three

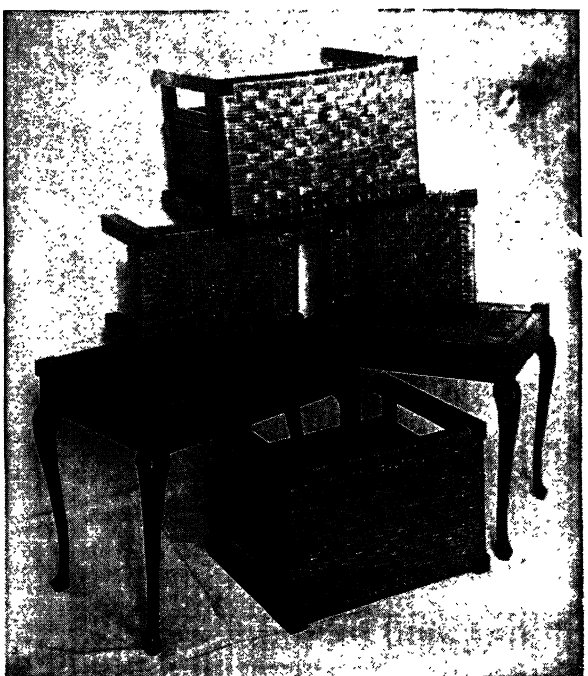


FIG. 63. WOVEN TOP STOOLS

times, then weave *over* the series which were woven *under* before and repeat alternately until the top is entirely woven. In weaving the top of this stool one strand is woven in the last series of three,

and to balance it a single strand is run in on the opposite side. The ends of this strand are not fastened in any particular way; the weaving holds them in place. The spaces next to each short rail may be filled in a like manner, if desired. Strands crossing underneath the frame must be woven in some manner to produce a seat of maximum strength. The character of the weave here is not pertinent; in this instance it might take the same form as the top.

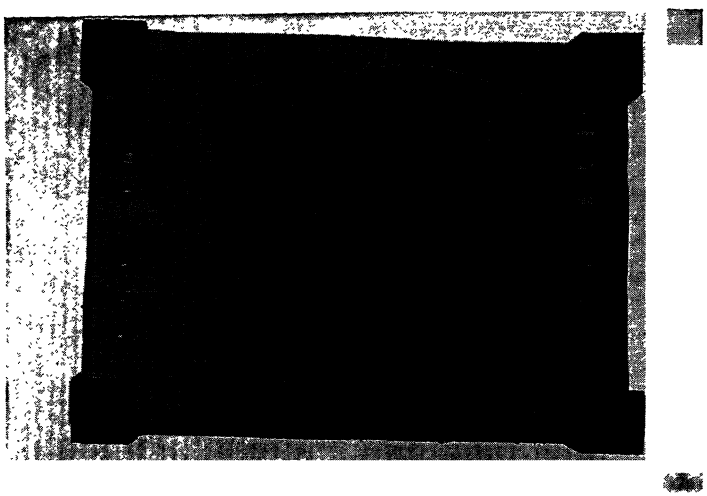


FIG. 64. WEAVING IN SERIES OF THREE

Fig. 65 shows a stool top woven of inner hickory bark strips employing what is termed a diagonal weave. Begin the wrapping on either the short or long rails. In this instance we will assume that the short rails have been wrapped; then the weaving will begin over the long rail and, as indicated, at the upper left-hand corner. The strands have been numbered to make the description clearer. The "diagonal" is determined at the edges of the upper

rail. The method of weaving may be expressed in the following manner:

Strand 1—Over 1, under 2, over 2, under 2, and so on.
Strand 2—Over 2, under 2, over 2, under 2, and so on.
Strand 3—Under 1, over 2, under 2, over 2, and so on.
Strand 4—Under 2, over 2, under 2, over 2, and so on.

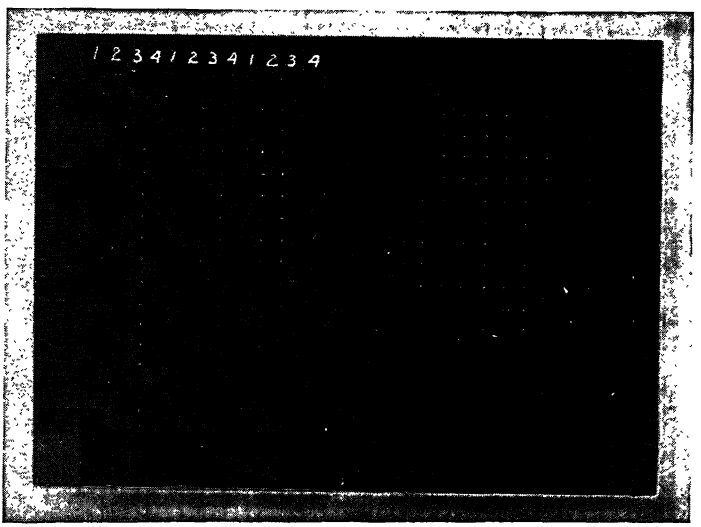


FIG. 65. STOOL TOP OF INNER HICKORY STRIPS

This completes the series or unit, and this unit repeats itself until the area is woven. For instance, the fifth weaver follows the same course as the first; the sixth weaver follows the same course as the second; the seventh the same as the third; and so on. The diagonal effect will remain the same if the weaver runs over three strands or more, providing the right start is made at the edges of the frame. In using inner hickory bark care must be exercised to keep the strands close together, for they shrink appreciably in

drying. A brad hammer with square face is an excellent tool to use for keeping the strands snugly together.

The method of weaving is shown a little more graphically in the sketch shown in Fig. 66. The short rails are continuously wrapped as previously indicated. Two units on the longer rails are completed, and these units are continued until the top is woven. In the sketch

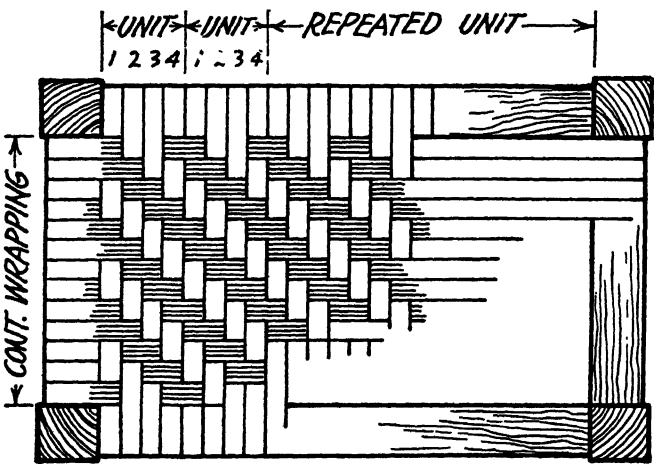


FIG. 66. THE DIAGONAL WEAVE

the first strand is shown as going under two strands at the start, whereas in Fig. 65 it is woven over one. This in no wise alters the weave.

A combination of half-round and flat reed is illustrated in Fig. 67. The half-round reed is wrapped about the frame first, and in this case every other strand is wrapped around the opposite rail, crossing underneath the frame only. The diagonal weave is employed, and is identical to the one just described in general effect. However, the weaver runs over three and under three in the body. Note the difference in the weave at the edges of the rails. When

using half-round reed it is necessary that every other strand be wrapped completely around the rails, for otherwise it would prove practically impossible to weave the area because of the thickness of the reed. A winding reed as shown in Fig. 58, or binder cane, could be run continuously, inasmuch as either is relatively thin.

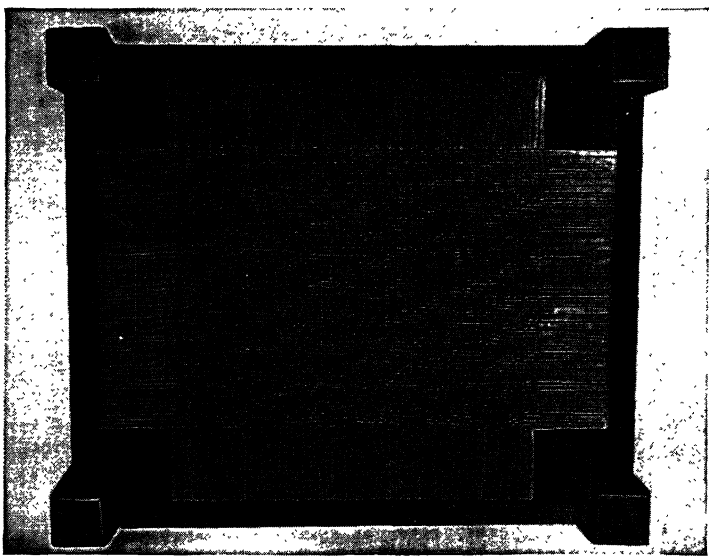


FIG. 67. STOOL TOP OF FLAT AND HALF-ROUND REEDS

Weaving with two kinds of reed will produce an area of pleasing high relief.

Fig. 68 illustrates a stool woven in flat reed. The diagonal weave is used running toward a common center, and it forms a diamond pattern or design. Begin wrapping on the long rails, skipping every other strand on the top as indicated. To weave this pattern it is necessary to locate the center of the short rails and the center strand of those running across the frame. In this instance the

strands are even in number, so the pattern does not begin at the actual center, but a little to the right or left, as the case may be. Beginning at the center, count by twos *over, under* and *over, under* and so on to determine the number of strands to go over or under at the edge of the frame. The first strand runs over *one* at the

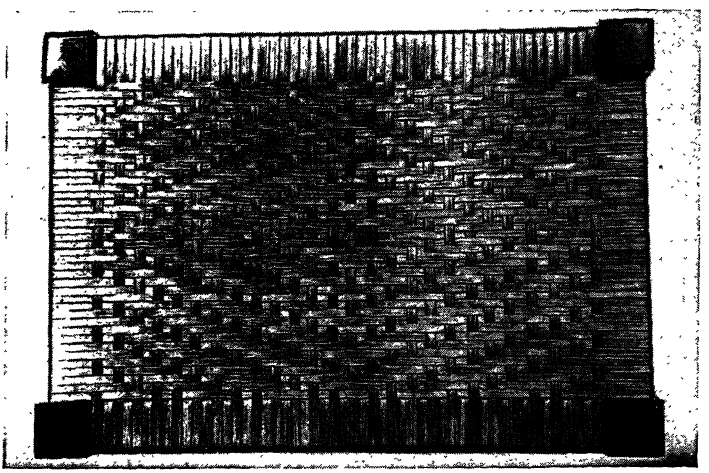


FIG. 68. DIAMOND DESIGN IN FLAT REED

center and over two and under two on either side. The second strand runs under *three* at the center, and over two, under two on either side. The worker must again count to the edge of the frame to determine the beginning weave, until the unit of four strands has been woven. Then the unit repeats itself *at the center* and *at the edges* of the frame. Beginning at the right side of the illustration the weaving is as follows:

Strand 1—Over 2, under 2, over 2, under 2, over 2, under 2, then over 1, and repeat across the other half of the frame.

Strand 2—Under 1, over 2, under 2, over 2, under 2, over 2, then under 3, and repeat across the frame.

Strand 3—Under 2, over 2, under 2, over 2, under 2, over 2, then under 1, and repeat across the frame.

Strand 4—Over 1, under 2, over 2, under 2, over 2, under 2, then over 3, and repeat across the frame.

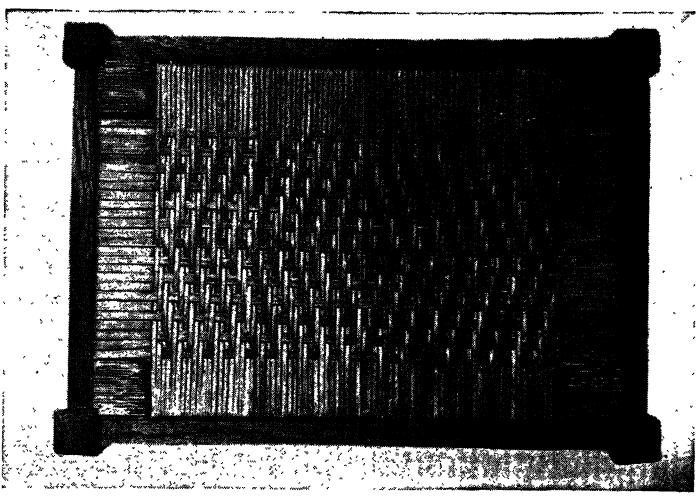


FIG. 69. DIAMOND WEAVE IN FLAT AND HALF-ROUND REEDS

These four strands comprise the unit, and it is repeated until the frame is entirely woven. Complete half of the frame first, then weave the other half, which is just the reverse of the first half. In starting the weave for the second half, strand 1 is omitted, for it is the center of the frame. After the worker has worked out the unit according to the method described, he will find it good practice to write it out graphically as above to use in weaving the seat. The unit above applies to the particular stool, and will not hold good on seats utilizing more strands, or fewer. Errors are easily made in weaving this pattern for the reason that strands need watching at two places. The seat of the stool at the top of the

group shown in Fig. 73 has a pattern identical with this one, except that the strands both ways are close together.

The top illustrated in Fig. 69 is practically the same in design as the one just described. The weavers run over the long rails in this instance, instead of the short ones, and half-round reed is used

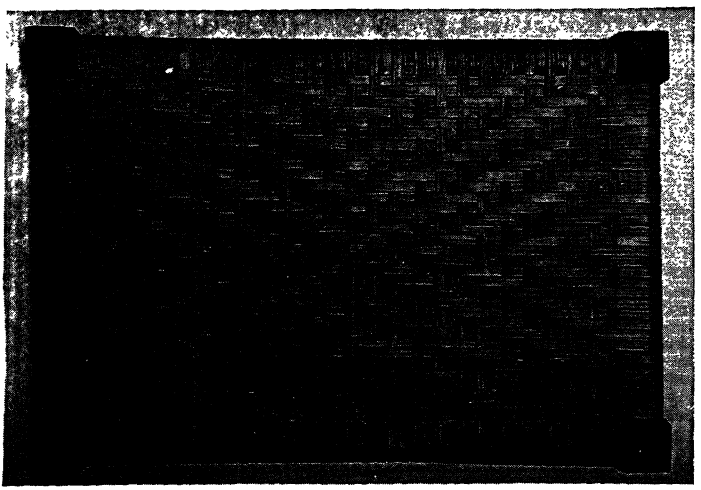


FIG. 70. WOVEN DESIGN IN FLAT REED

for the weavers, with the flat reed utilized for the wrapping. The first weaver of half-round reed runs *under* the center strand, and the two second weavers run *over* three strands on either side of the first, at the *center* of the area. The combination of the half-round and flat reeds produces a seat both pleasing and serviceable.

Fig. 70 illustrates a stool top woven with flat reed entirely, in a design the very opposite in effect of that shown in Fig. 68; instead of evolving a diamond effect, the diagonals appear to radiate from a common center. The method of weaving is identical to that of Fig. 68 in that the operation begins at the center of rails instead of next to the posts. The first weaver is woven over the center

strand at the center of the top, and the second weaver, on either side, is woven *over three* strands, at the center. These three weavers practically determine the design and effect produced. An error of no vital importance exists in this particular stool top. It will merely emphasize the fact that particular care is necessary to avoid mistakes.

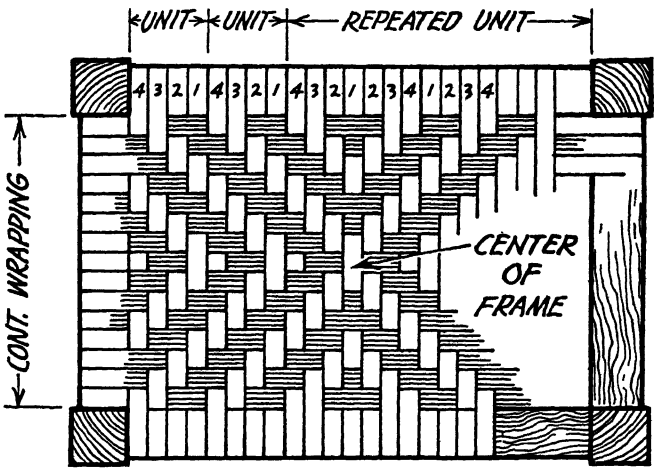


FIG. 71. METHOD OF WEAVING FOR RADIAL PATTERN

The same radial pattern is clearly shown in the sketch at Fig. 71. The units are indicated and numbered from one to four. The different effect from that illustrated in Fig. 70 is that produced by using a weaver of greater width.

Fiber is the material used for the top of the stool shown in Fig. 72. The diagonal weave is employed. The process of weaving has been explained and needs no further discussion. The fiber is the same as that discussed in Chapter V. It adapts itself admirably to this form of weaving, and when properly finished with varnish makes a serviceable seat, pleasing in every particular. The strands which run across the frame in the wrapping must be some distance

apart; otherwise weaving would prove impossible. The thickness of the strands preclude their being wrapped close together as in the case of thin materials. In this case a space equal to the width of three strands is left. The weaver runs over two and under two strands in the body.

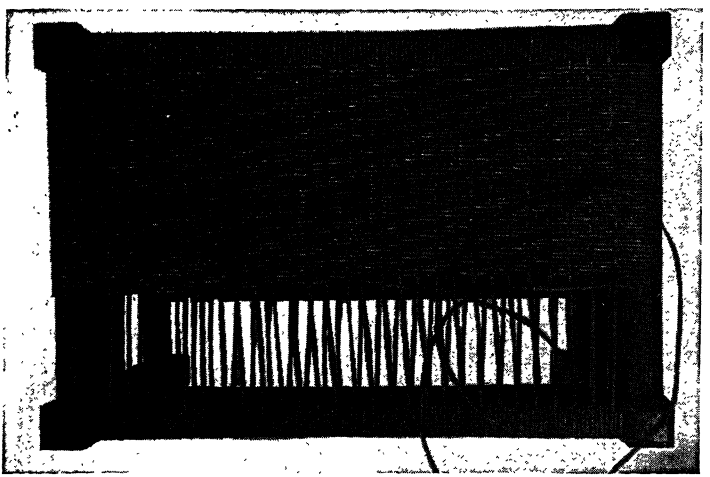


FIG. 72. STOOL TOP WOVEN WITH FIBER

While reeds and inner hickory bark shrink in drying, they will shrink mostly in width and not much in length. Therefore it is necessary to pull all strands, both in wrapping and in weaving, rather tight at all times. Only by doing this will the worker be assured of an ultimately taut seat. This applies also to the Indian splints now to be discussed. As fiber is woven practically dry it needs to be pulled particularly tight.

Indian Splints.—Fig. 73 shows a group of stools and a waste-basket constructed in eighth-grade shops. The tops of the stools and the panels of the basket are woven of hickory splints ½ in.

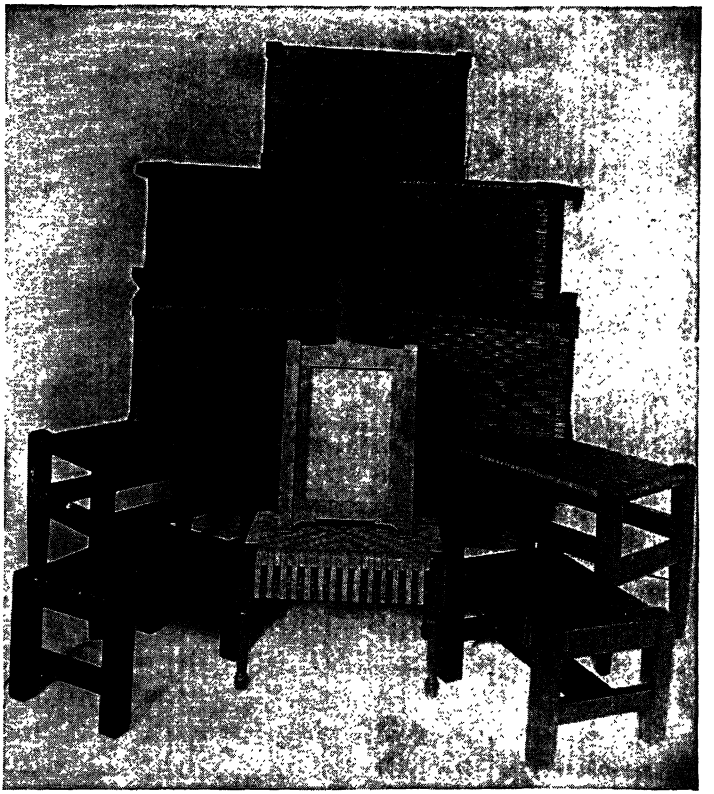


FIG. 73. GROUP OF STOOLS; TOP WOVEN WITH INDIAN SPLINTS

in width. A variety of patterns is shown, and these will suggest other ones. One of the stools has turned posts and the splints are carried over the sides of the rails. With slight modification of the structure, the sides might be woven in a similar manner to the top. The panels of the basket were woven over a separate frame, then they were cut to fit the frames of the basket, and finally tacked on the frames. The edges of the splints were covered with thin wood

strips held in place with brads. These panels should be inserted and secured while damp to insure proper tautness, and to prevent as far as possible splitting the ends of the splints in tacking them to the frames.

It is not advisable to tack splints onto seat frames, either as an insert or slip seat, or on the rails of the structure itself. The splints split easily when tacked, the strands are bound to pull loose, and the seats break down under continued use. On such articles as wastebaskets, boxes, screens, and the like, tacking the panels in place is necessary and proper, for no appreciable wear or service comes to them. The weaving on seats needs to be continuous over and under the frame.



FIG. 74. METHOD OF FASTENING ONE STRAND TO ANOTHER

When a strand of usual length has been wrapped about the rails of the seat, a second strand needs to be added to continue the wrapping. Tacking the strands to the under side of the rails, as in the case of reeds, cannot be resorted to with splints for the reasons just explained. Therefore some method of fastening strands to each other is necessary. Fig. 74 is a freehand sketch showing a good method. As indicated, a small rectangular piece is cut out of the used strand at *B*, one inch from the end. A chisel or chip-carving knife is good for the purpose. Cut across the grain of the wood first to avoid splitting the splint. The end of the new strand *A* is notched as shown an inch back from the end, and is then inserted through *B* and the

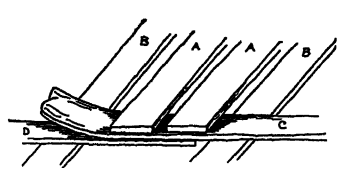


FIG. 75. METHOD OF OVERLAPPING WEAVERS

two strands thus secured. All subsequent strands are secured in the same manner.

Another method which works well and involves less labor than the one just described is that of fastening the strands together with

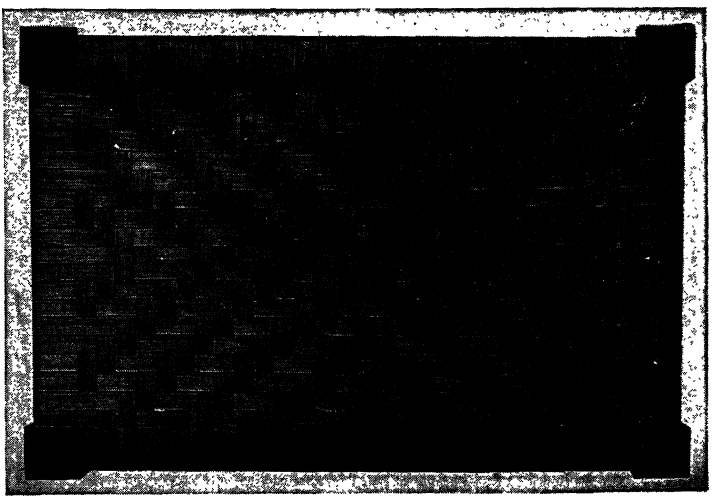


FIG. 76. WOVEN DESIGN IN HICKORY SPLINTS

metal staples. Any type of small hand stapler will accomplish the result. The splints must be very pliable when the staple is inserted and clinched, for if they are not, the splints are certain to split. Clips used in Venetian ironwork are excellent for this purpose also. It should be understood, for reasons very obvious, that these fastenings are made underneath the frame.

After the wrapping of the opposite rails is completed, the weaving is begun. The use of tacks here is also unnecessary and is inadvisable. Fasten a new strand by overlapping the end of the old one for several inches either on top or underneath the frame. The ends of each will be hidden under cross strands or spokes. Fig. 75 is a sketch

illustrating the method of overlapping. *AA* shows strands running *over* the weavers, and *BB* strands running *under*. *D* is the end of the old or used strand, and *C* one end of the new one. *C* is pulled

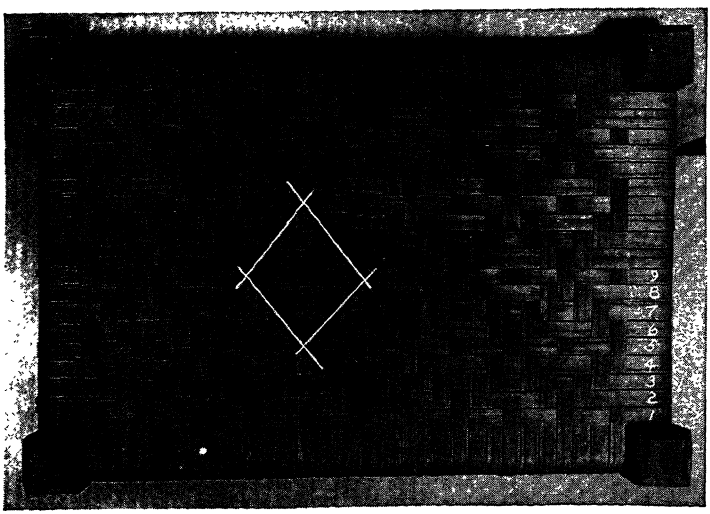


FIG. 77. WOVEN DESIGN; DIAMOND EFFECT

until the end is hidden under *A*. It is advisable to overlap the distance of a number of strands and not merely two as the sketch indicates. The sketch merely shows the method. The end of the strand which completes the weaving of the seat is secured underneath the frame by weaving for a short distance in the usual manner.

Fig. 76 is merely Fig. 70 repeated as far as the weaving processes are concerned. In this instance hickory splints are used, and the rails are wrapped continuously across the top. Note the different effects produced, by comparing the two figures.

Fig. 77 shows a rather unusual weave. The effect is that of a number of diamond areas over the entire surface, one of which is marked to make the unit or design evident. This design need not

begin at the center, but may begin at the edge of the frame as in regular diagonal weaving. The strands comprising the unit are numbered for convenience. The process of weaving is as follows:

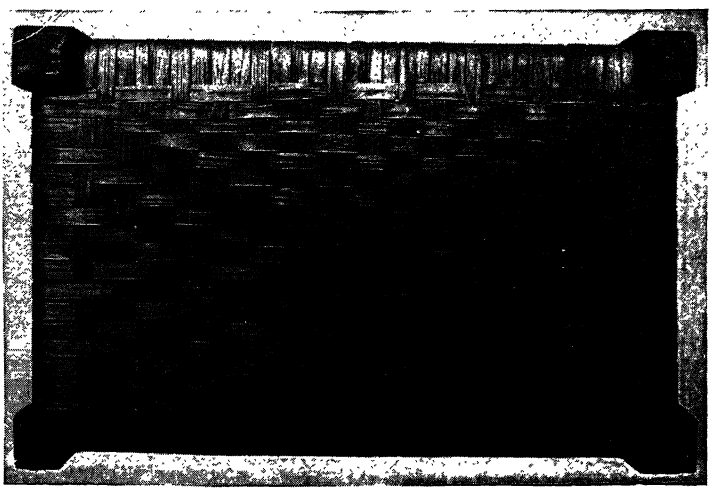


FIG. 78. DESIGN OF INDIAN SPLINTS

Strand 1—Under 1, over 2, under 1, over 2, and so on.
Strand 2—Over 2, under 3, over 3, under 3, and so on.
Strand 3—Over 1, under 2, over 1, under 2, and so on.
Strand 4—Under 2, over 3, under 3, over 3, and so on.
Strand 5—Under 1, over 2, under 1, over 2, and so on.
Strand 6—Under 2, over 3, under 3, over 3, and so on.
Strand 7—Over 1, under 2, over 1, under 2, and so on.
Strand 8—Over 2, under 3, over 3, under 3, and so on.
Strand 9—Under 1, over 2, under 1, over 2, and so on.

Nine strands comprise the unit. One half of the unit from strand 5 is a repetition of the first half, except that the order is reversed. Thus strands 4 and 6, 3 and 7, 2 and 8, and 1 and 9 are identical in weave. Repeat the unit until the seat is completed.

The design produced in Fig. 78 is obtained by skipping certain strands for rather unusual distances. This may be done in instances where the pattern is begun at the center of the area. No strand should be omitted its entire length however. Any number of designs may be worked out, limited only by the patience and ingenuity of the individual worker.

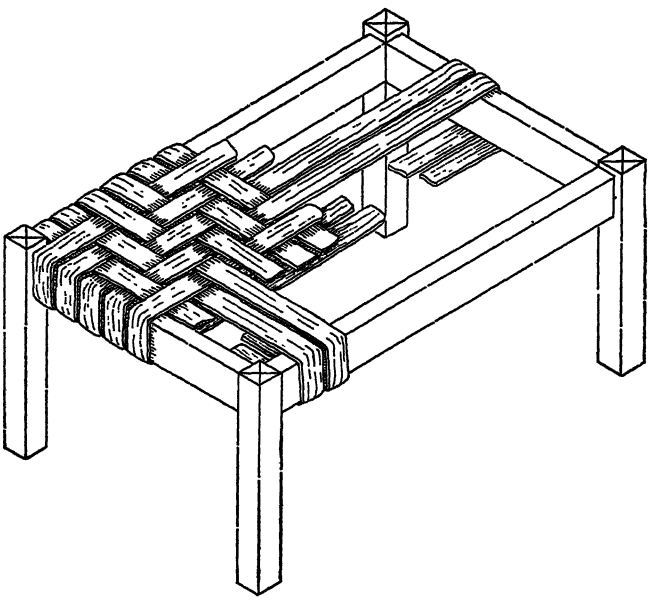


FIG. 79. METHOD OF WEAVING SPLINTS

A design for a seat or panel not illustrated herein, but which is particularly pleasing in its general effect, is produced by a unit of six strands repeated indefinitely. The weaving is started as in the diagonal weave and the process may be indicated as follows:

Strand 1—Over 1, under 3, over 3, under 3, and so on.
Strand 2—Over 2, under 3, over 3, under 3, and so on.
Strand 3—Over 3, under 3, over 3, under 3, and so on.

Strand 4—Under 1, over 3, under 3, over 3, and so on.
Strand 5—Under 2, over 3, under 3, over 3, and so on.
Strand 6—Under 3, over 3, under 3, over 3, and so on.

The isometric sketch of a stool, Fig. 79, shows the structure partly woven. It will be noticed that the splints or reeds run both ways underneath the frame as they do on top. As indicated previously these strands underneath should be woven in some manner to insure a seat of maximum strength for the material used. The diagonal weave was arbitrarily chosen to illustrate the method of weaving the seat frame. The weaving underneath is not shown on the sketch. If the rails on any seat are run flush with the inside corners of the posts the woven strands will fill the entire space. On the other hand, if they are permitted an offset, a series of open spaces are left as shown on the first woven seat illustrated. The sketch shows the rails flush with the inner corner of the posts.



FIG. 80. PORCH CHAIR WITH BACK AND SEAT WOVEN WITH SPLINTS

Rustic Chairs.—The kinds of frames which are particularly adapted to splint-and-inner-hickory bark weaving are illustrated in Figs. 80 and 81. The former is not as rustic in appearance, for the wood members have been sanded and finished. However, the latter is constructed of hickory with the bark clinging to the pieces. Construction is simple, and the necessary bending of pieces is readily done if a suitable steaming chest is available in the shop. Such a chest may be made of a 6 in. gas pipe cut the required length and

threaded at both ends. Cap one end permanently. Have the cap for the other end removable, with a gasket in it to prevent the escape of steam, and a suitable handle attached for ease in removing. Set the pipe upon a standard, then make the necessary steam connections at the closed end and the drain at the other. Place the wood in the chest, screw on the cap, and turn on the steam. The length of time the wood should remain in the steam depends upon the wood and size of the piece.



FIG. 81. RUSTIC CHAIR WITH SPLINTS

Suitable wood forms are easily made for bending stock. Their construction needs no elaboration. When the pieces are removed from the chest, clamp them over the forms immediately, and allow them to remain clamped in this manner for several days in a dry, warm room. If steam coils or hot-air registers are handy the forms may be placed over or near them to expedite the drying.

Rock elm is a good material from which to construct such chairs. The wood may be procured in the round, of different diameters. The tenons on the straight pieces may be made on the wood lathe; on the curved ones with spokeshave or drawknife. The short, thin pieces on the sides should be fully housed. On chairs of this description it is good policy to assemble the sides first. Finish both the frame and the splints with a good paint composed of white lead and oil.

Another excellent material for chairs of similar design and purpose is hickory. It is the best material for the construction of furniture for lawns and porches where weathering is constant, and it is

peculiarly adapted to splint-and-inner-bark weaving. If a person lives in the right locality he may gather young second-growth hickory saplings in the fall. An instructor could very readily take his classes out on such a wood-gathering expedition. The educational gain in gathering raw materials to be fashioned into finished articles of use and beauty will justify all efforts. In the fall the bark of the saplings will adhere firmly to the wood. Trim and assort the different pieces in accordance with plans, cut them into approximate lengths, and steam and bend those desired. Sand each piece smooth, and proceed to construct the chair according to previous plans. Glue and nail all important joints to prevent any possibility of separation under any weather condition. No finish of any description is necessary or desired on hickory furniture. Weathering will naturally darken both frame and splints, but will not detract in any way from the rugged, pleasing appearance of the article.



FIG. 82. FERNERY WITH WOVEN SPLINT PANELS

Sassafras is a very desirable wood for rustic furniture, and well adapted to splint weaving. The methods of gathering and finishing are identical to hickory. It is much lighter in weight than hickory, but is quite as serviceable. No finishing agent is necessary, although the worker may oil or varnish it at his discretion.

Fernery.—Fig. 82 shows an excellent utilization of woven splint panels as a decorative element on a fernery. A working drawing of this piece of furniture is shown at Fig. 83. It is suggested that oak or maple be used in construction, rather than mahogany or walnut, which would be somewhat out of keeping with the woven areas.

It is a good procedure to build a temporary frame, larger than the panel area on the fernery, on which to weave the splints. On one end of this frame tack the ends of the longer strands, then cut a quantity of the shorter ones and weave them one at a time to form the predetermined pattern. When completed the woven panel is cut to size and tacked to the frame. Thin strips of wood will securely hold the panel in place.

Willows.—Willows are imported normally from Germany, Holland, Belgium, and France. Because of their scarcity and demand for them, willow growing is fast becoming a thriving industry in the United States. Many experimental farms are under the direct supervision of the federal government. These have demonstrated that willows can be grown to advantage in many localities in this country. In many instances manufacturers have abandoned rattan in favor of willows for certain articles of furniture where rattan was formerly used exclusively. Willow possesses all the attributes necessary for such furniture, being light in weight, durable, and strong; and it takes a good finish.

Willow stems or rods are cut when several feet long. They are then soaked in water and the outer bark peeled. The rods are then sorted, bundled, and shipped to the dealer or user. The peeling is generally accomplished by hand with a peculiarly forked stick or rod. Commercially there are what are termed dry-peeled rods and steam-peeled rods, with the former in favor for furniture of the better class. Willow stems are used extensively in basketry, and for porch and summer furniture. They cannot generally be utilized

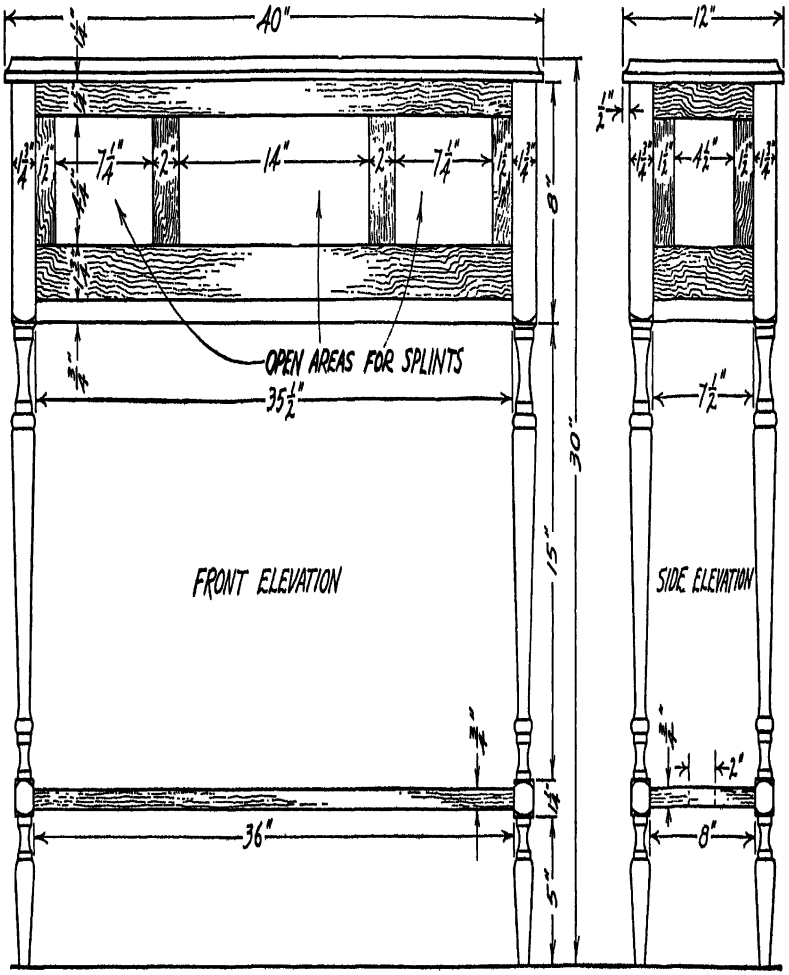
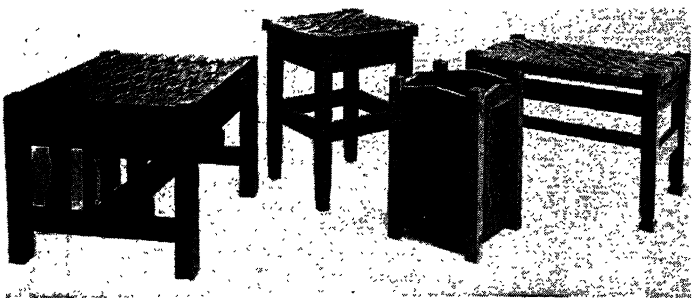


FIG. 83. WORKING DRAWING OF FERNERY

advantageously in school shops for seating purposes only. However, they have very definite uses on some structures, and an adequate supply should be kept on hand for use when opportunity offers.



SUGGESTIVE PROJECTS

HAND CANING; THE "SPIDER-WEB" WEAVE

In discussing the "spider-web" design in cane weaving it is assumed that the person who may wish to work out the weave is conversant with the standard cane-weaving processes. He then understands how to manipulate the canes to prevent twists; how to tie loose ends; how to properly weave the edges; and the numerous details incident to the processes of weaving of such a character. This weave is too difficult for the novice. He needs a previous experience in five-step or seven-step caning. To undertake this weave without previous experience would mean ultimate discouragement. With such a foundation, however, he may undertake to work out the web design without temerity. The design is rather intricate, yet the processes are definite and distinct. It is very pleasing and adapted to work in school shops generally.

The "spider-web" weave may be worked out in an order similar to that of the standard cane weaving. In the standard weave we have termed it "seven-step caning," because of the very definite seven processes involved in its pattern. In the design under consideration the term series will be designated to indicate the processes. There are seven series, including the binder.

The Seven Series

Series 1. Fig. 84 shows clearly the start of the canes and indicates the holes which the canes enter. The method of manipulating the canes will not be discussed here. The holes shown are ½ in. apart, 3/16 in. in diameter, and ½ in. from the inner edges of the frame. The cane used in this series is medium size. Emphasis must be made here that in this and the next series the canes cannot run at right angles to each other, but must make such an angle with the rails and with each other as to form true diamond-shaped areas. The canes of each series run parallel to each other. While this is not

always practically possible, it is a rule, and any great divergence from a parallel indicates that an error has been made.

Series 2. In this series the canes are laid over those of the first series and produce the same angle with the rails as do the canes of the first series. The diamond-shaped areas are clearly indicated in Fig. 85. In this instance the canes enter the same holes as those shown in Fig. 84, yet this condition does not hold good on all shapes, or where hole spacings vary; consequently it is a coincidence and not to be accepted as a rule of procedure. A medium-sized cane is utilized in this series.

Series 3. In Fig. 86 the actual weaving process begins and continues through all the succeeding series. It is not possible to run these canes straight into the holes always; they must veer from a straight line to enter that hole which makes their course as straight as possible. This may be accepted as a rule for all series. The canes in this series are woven *under* the first series of canes and *over* the second series. The drawing shows this clearly, and indicates the small triangular areas left by the process. Also the diamond-shaped areas are reformed into hexagonal ones. A medium-sized cane is employed as previously.

Series 4. In this series is begun the weaving which produces the fine strands of the "spider-web." A carriage cane is the size used here and in the next two steps. Fig. 87 shows the method of weaving the canes. They cross *over* the intersections of canes of Series 1 and 2 and *under* those of Series 3. These canes will generally enter each hole in succession as indicated in the sketch.

Series 5. The canes of this series, shown in Fig. 88, cross *over* the intersections of canes of Series 2 and 3, and also *over* the canes of Series 4 at the triangle and *under* at the center of the hexagonal areas. These facts hold true in the succeeding series—over the canes in the triangular areas and under those of the hexagonal areas. Note that the canes swerve slightly to enter the proper holes.

Series 6. Fig. 89 shows how to weave the canes. They run *over*

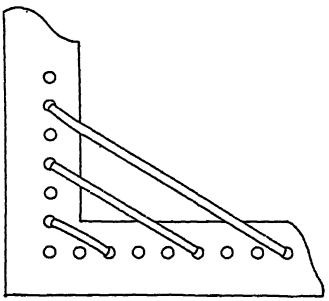


FIG. 84

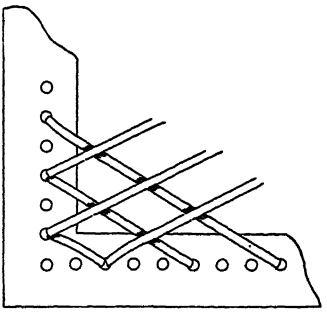


FIG. 85

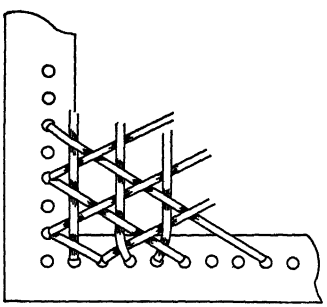


FIG. 86

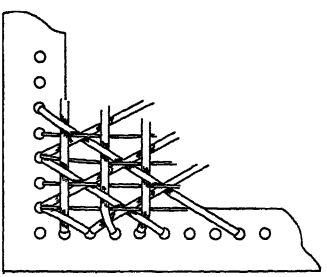


FIG. 87

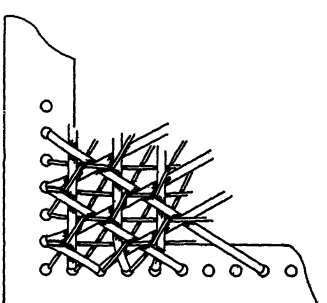


FIG. 88

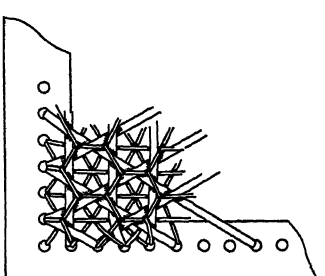


FIG. 89

the intersections of canes in Series 1 and 3, *over* the canes at the triangular areas of Series 4 and 5, and *under* those in the hexagonal areas. A close study of the drawings will give to the worker a clearer idea of the processes than an elaborated discussion could possibly give. Therefore reference is particularly made to the drawings for details. Such statements as have been given will serve as guides and checks. Errors are readily made in Series 4, 5, and 6, unless caution is exercised at every step. The final test of a well-caned area—granting that the main area is mechanically correct—is the appearance of the edges of the area. An expert's job will show careful, neat work at the edges, while that of the average amateur indicates a certain avoidable carelessness. One of the invoilable rules of all cane weavers should be this: If a cane be woven in incorrectly, and the worker is aware of the fact, that cane should be taken out and another woven in correctly.

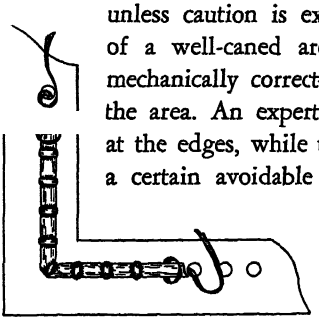


FIG. 90

Series 7. As a matter of fact, this series should not be considered one of the processes in weaving the "spider-web" design, for it is common to all forms of hand caning. In this design, however, the binder is necessary to give a finished appearance to the work because of certain peculiarities of the weave. Fig. 90 shows how to hold the binder. Binding cane comes in three sizes—a narrow binder, a medium binder, and a wide binder. For holes over three-sixteenths inch in diameter a wide binder is necessary to cover the holes. The finer cane which holds the binding cane must be pulled rather taut to insure a neat, serviceable job. If the particular frame over which the caning has been done is exposed to view, the canes in the rear may be covered with a thin wood strip in which a shallow groove has been run. Otherwise the cane ends may be bound and tied in the usual manner.

In working out a coarse mesh in this design a coarser cane may be used or not, at the option of the worker. A hexagonal area, three-fourths inch over all, produced by medium and carriage canes, gives a mesh standard in fineness.

Fig. 91 shows an area woven by an amateur. The binder is held at every other hole, a procedure very proper where holes are one-

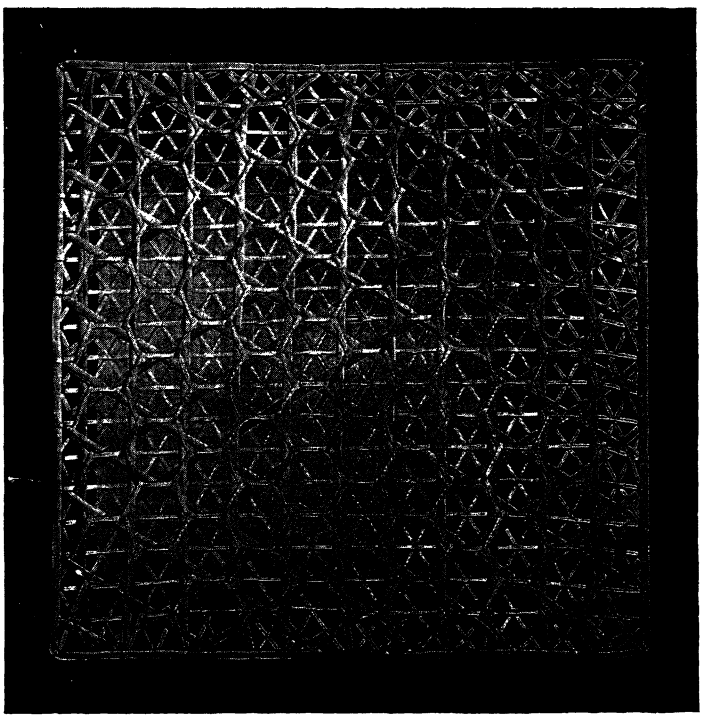


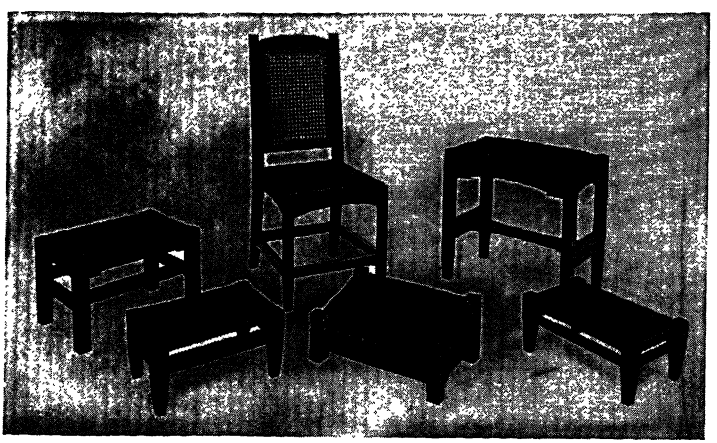
FIG. 91

half inch apart or closer. A close study of this area will disclose certain inconsequential errors. Extended experience with the weave

will eliminate similar mistakes and produce as nearly perfect a piece of work as is possible over wood structures.

This weave is particularly adapted to reed, willow, and cane furniture. On such structures the holes may be made between canes and reeds the proper distances apart at will of the worker. It is then always possible to run canes straight and true, securing well-woven edges. This is not always possible on wood structures where holes must be bored at given intervals.

The "spider-web" weave is particularly decorative; it is as serviceable as the standard weave, and is well adapted to furniture of rather light, general lines. The weave is more difficult than the standard one, but because of its unusually pleasing design, is well worth the patience and time the worker must necessarily give to its production.



SUGGESTIVE PROJECTS